The IRON AGE

May 1, 1958 A Chilton Pubiication The National Metalworking Weekly

How to Cut Materials Costs P. 51

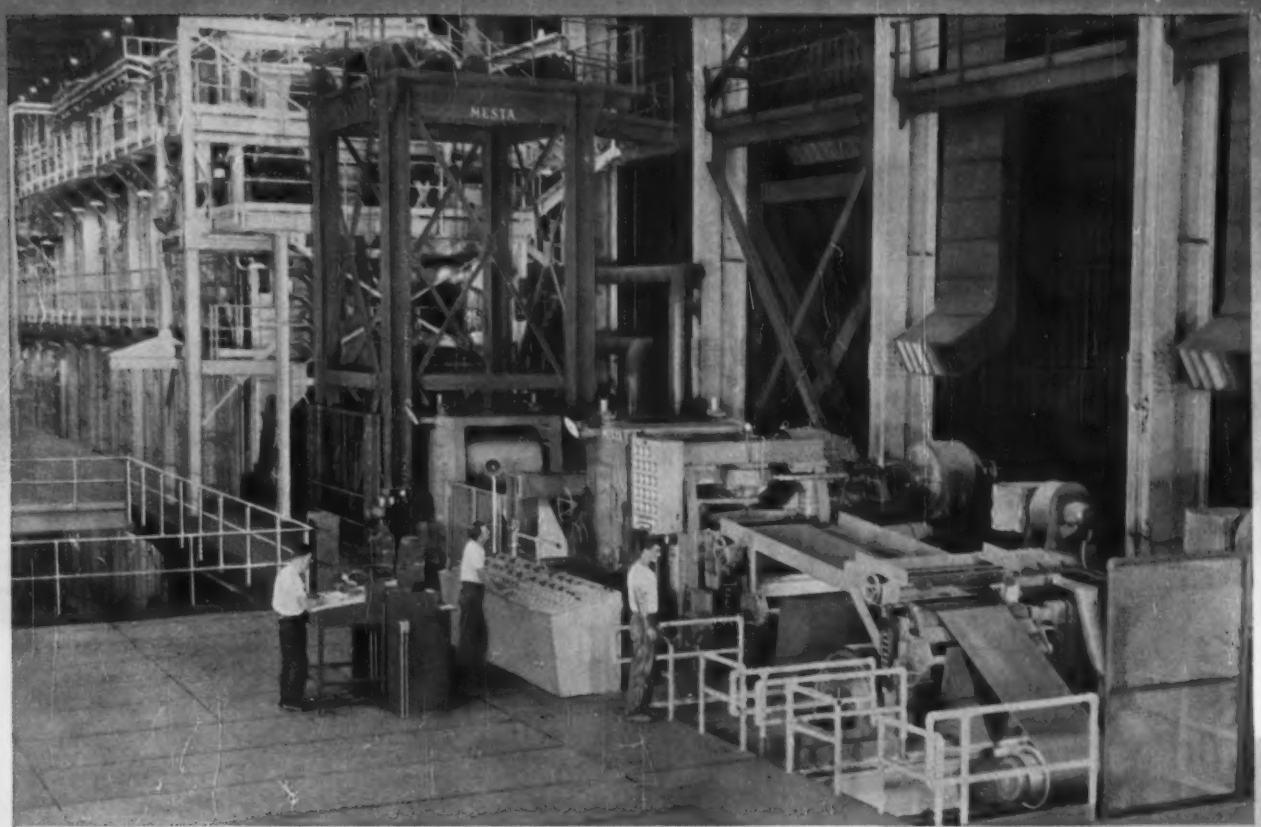
What Are Chances For A Capital Goods Upturn? – P. 37

Ways to Machine Laminated Plastics – P. 77

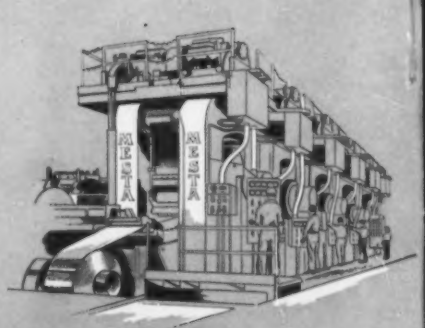
Digest of the Week P. 2-3

CLEANING AND ANNEALING LINES

Designed and Built by MESTA



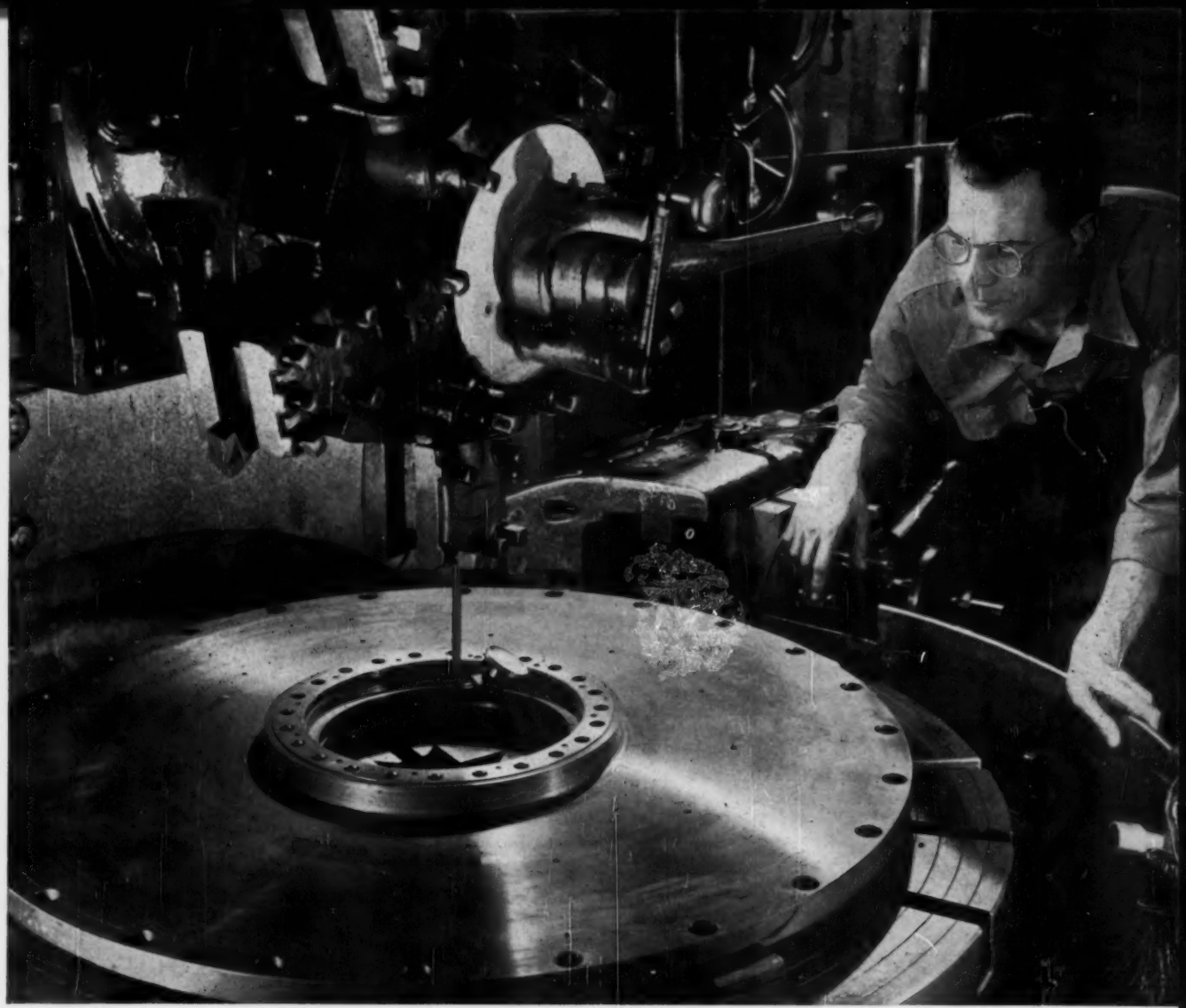
MESTA 2000 FPM Continuous Cleaning and Annealing Line for Steel Strip in Tin Plate Gauges with Pay-Off Reels, Mash Welder and Tension Reels in Operation at Weirton Steel Company, Division of National Steel Corporation.



Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA



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The IRON AGE

May 1, 1958—Vol. 181, No. 18

Digest of the Week in

★Starred items are digested at right.

EDITORIAL

The Summit Gimmick: What's the Lowdown on It? 7

NEWS OF INDUSTRY

★What Are the Chances for a Capital Goods Upturn? 37
★Better Market Due, Steelmen Say 39
★Merger Headed for Supreme Court 40
★Many Carbide Users Buy Blindly 41
★Alcoa Bids for Packaging Sales 42
★Chrysler Reorganizes 43
★The IRON AGE Salutes 47
★**Special Report to Management:** How to Cut Materials Costs 51
Men in Metalworking 66

FEATURE ARTICLES

★How to Machine Laminated Plastics 77
★Extra Forging Steps Yield Benefits 81
★Tape-Controlled Miller Savings 84
★Vibration Analysis Proves Worthy 86
Gravity Speeds Truck Loading 89
★Computer Aids Flame Profiling 90
Electroforms Feature New Nickel 92

NEWS ANALYSIS

Newsfront 35
Report to Management 49
★Automotive 54
★Washington 59
West Coast 61
Machine Tool 63

MARKETS & PRICES

★**The IRON AGE Summary** 115
★Purchasing 116
Steel Product Markets 118
Index to Prices 119
Iron and Steel Scrap Markets 120
Nonferrous Markets 124
Clearing House 134

REGULAR DEPARTMENTS

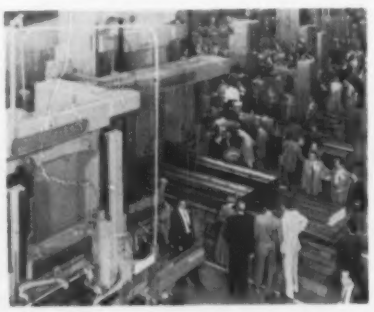
Fatigue Cracks 11
Technical Briefs 102
Materials Roundup 106
New Equipment 108

INDEX TO ADVERTISERS 140

NEWS ARTICLES

CAPITAL GOODS

Downtrend into 1959—An upturn in general business conditions will have to precede a new capital



goods spending spree. But there are intangibles that could reverse the downtrend. P. 37

STEEL OUTLOOK

Improvement Predicted—Inventory cutting should end by midyear, steel industry leaders say. They expect a sales pickup by Labor Day or sooner. Price increases on July 1 are called inevitable. P. 39

STEEL MERGER

To Supreme Court—Both sides in Bethlehem-Youngstown merger case indicate they will appeal adverse decision. Courtroom tactics are only preliminaries. Capacity costs argued. P. 40

CHRYSLER REORGANIZES

Divisions De-emphasized—

Metalworking

COST CUTTING PLAN: Group at Oster Mfg. Co., Cleveland, discusses ways and means of cutting material costs. They found many opportunities for savings in non-manufacturing functions such as design and purchasing. P. 51

Sweeping changes at Chrysler convert its auto divisions into nothing more than sales groups. Move is part of a swing to centralized control. P. 43

ATOMS FOR INDUSTRY

Uses Are Lagging — Practical uses of isotopes in industrial processes aren't living up to earlier predictions. There are many reasons why. P. 54

FEATURE ARTICLES

LAMINATED PLASTICS

How to Machine — Reinforced plastic materials, both laminated and molded, are being used more and more along with metals, as well as to cope with problems metals won't solve. P. 77

EXTRA FORGING STEPS

Yield Special Benefits — Even though extra forging steps add to die and labor costs, the extra amount is often more than offset by less machining later on. Further, the forging can improve certain qualities of a part that wouldn't otherwise result. P. 81

TAPE-CONTROLLED MILLER

Saves on Short Runs — A 14-channel magnetic tape controls a 3-D profile and contour milling machine. The setup may find its biggest market in small shops. While linked with mass production, the system may become even more renowned as the cheapest and best way to machine short runs. P. 84

VIBRATION ANALYSIS

Proves Worth in Production — Manufacturers can check their products and correct faults before machines are shipped. Equipment users can locate points of wear or imbalance before they become serious. P. 86

FLAME PROFILING UNIT

Computer Cuts Steps — A new flame profiler follows instructions from a magnetic tape. Prepared by a computer, the tape bypasses many of the conventional stages between drawing board and finished part. P. 90

MARKETS & PRICES

CARBIDE TOOLS

There's Lots to Learn—A survey reveals surprising laxity throughout industry in specifying carbide cutting tools. Nearly half the machines now in use are unsuited for use with carbides. P. 41

FOIL

New Facilities—Alcoa spiced up unveiling of new foil and packaging facilities with a peek at some of their projects. Their entry in the "aluminum can" field will be a foil-and-fiber-board model. P. 42

RED TRADE

It Will Increase — There is a subtle but unmistakable change in official Washington's attitude on trade with Russia. And there is pressure from Free World nations that have surpluses. P. 59

MORE OF THE SAME

Slow Steel Recovery—The pick-up in steel is painfully slow. Some steel men look for a third quarter improvement, others don't expect much until fall. P. 115

CASTING COSTS

Get Critical Check—During the recession some companies are finding it cheaper to shut down captive foundries and buy outside. Independents are able to keep operating costs more in line. P. 116

NEXT WEEK

FOUNDRY AUTOMATION

Where Is It Headed?—The demand for speed without regard for other factors could delay progress in foundry automation. Next week, a leading executive takes time out to re-evaluate the entire concept of mechanization in foundries.

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The Summit Gimmick What's the Lowdown on It?

The Russians would want no summit meeting unless they thought it would do a lot for them. Anyone who thinks otherwise doesn't know either the Russians or the Communists.

Time and again we have gone through this summit procedure only to find out later that we were unable to avoid a trap. The Reds almost always came out on top. Right now we are being drawn into a meeting that will do us no good at all, no matter what the appeasers say.

If Red master Khrushchev really represented the Red masses, well and good. Probably some improvement could come out of a meeting. But anyone who has read what Khrushchev has said consistently should know that the hidden purpose of the summit meeting is to smash the democracies.

The new boss of the Kremlin wants to be seen at the top telling off the heads of the free world. This way—now that he wears both hats—he can try to take the stance that he is a great fellow and a world leader.

Those who know the truth can see that he is neither a leader nor did he get to his top position except by brutal inhuman methods.

Maybe how Khrushchev got to the top is none of our business. But it is our business if he uses a summit meeting gimmick to give the impression that he as "leader" of the Russian people wants peace for the good of all.

We ought to know as a nation—our diplomats do know—that Khrushchev is trying to throw dust in the eyes of the Middle East, Africa, and the neutral countries by a sham meeting. While he does that the aims of communistic domination, the position of satellites and the cold hard facts of international chicanery can be blotted out for the moment.

The United States is being blackmailed into the summit meeting because it fears what nations not committed to Communism or Democracy will say. Also, we want to be known as a peaceful nation. Sometimes it seems as though we are too afraid of the so-called propaganda gains of the Reds. Maybe they are not gains at all. Maybe our friends can see the Communists for what they are.

If we do go into this meeting—which will be a waste of time—let us all assume that there is nothing but a remote chance that anything good will come of it—for the free world.

If the Reds were even suspicious that we might gain from such a meeting they would never have suggested it in the first place.

Tom Campbell

Editor-in-Chief

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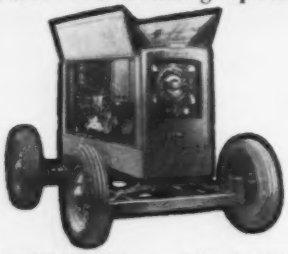

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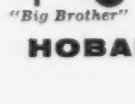
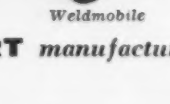
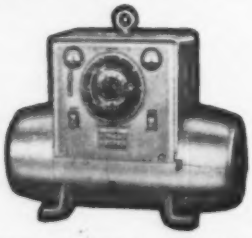


"Big Brother"



Weldmobile



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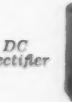

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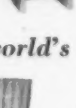
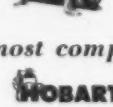


DC Rectifier



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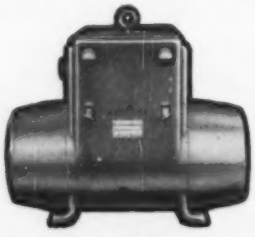

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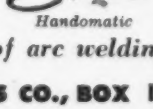

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LETTERS FROM READERS

Wage Moratorium?

Sir — Your Apr. 10 editorial, "The Big Brother Pit—Are We Falling Into It?", hits the nail right on the head, especially the paragraphs about union wage increases.

In my opinion, if the unions would come out for a five-year moratorium on wage increases, you would see the biggest five-year boom ever and we would get back some of our lost export business. The working man would benefit by his own productivity and not at the expense of the general public, particularly school teachers, government employees, and widows.

The Big Three have really ruined their own automobile business. It seems to me that they have made just about every mistake possible, including the wrap-around windshield, the 14-in. wheel and the crawl-in type body which will now accommodate four instead of six passengers. These too frequent model changes cost the public a billion or a billion and a half dollars every year.

So, the public starts buying foreign cars which look about the same year after year. And automobile stocks depreciate in value just about as fast as U. S. cars.—C. G. Browne, General Sales Mgr., Sweet's Steel Co., Williamsport, Pa.

Big Brother

Sir—I would like to shake Mr. Campbell's hand on his editorial in the Apr. 10 issue ("The Big Brother Pit—Are We Falling Into It?").

I think that he is so near right and hope that you will continue to publicize his views.

I agree that, "The ones who are helping us to kid ourselves—aside from ourselves—are those who have been elected to look after our nation's future, the lawmakers."—C. A. Dreisbach, Dreisbach Engineering Corp., Yonkers, N. Y.

Sir—I want to compliment you on your excellent editorial in The IRON AGE of Apr. 10.

We wish it were possible to get your message across to every single individual in the United States. Then possibly we could have a reaction that would at least get us back on the right track.—P. W. Hussey, Jr., Treas., Hussey Mfg. Co., Inc., North Berwick, Me.

Tool Steels

Sir—We are conducting a course in applied machinability for our supervisors. We are especially interested in obtaining reprints of your two-part article, "Survey Hot-Work Tool Steels For Aircraft and Missiles." In addition, we are extremely interested in obtaining the article entitled "Alter Tool Structure For Longer Life."

About 30 copies of each will be sufficient for our needs—R. D. Halverstadt, Metal Working Lab., Aircraft Gas Turbine Div., General Electric Co., Cincinnati.

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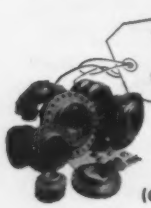

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PITTSBURGH · NEW YORK · ATLANTA · CHICAGO · HOUSTON · LOS ANGELES

The Near Editor

What's a near editor? He's a "poor imitation of the real thing," according to Major Aaron E. Carpenter, chairman of the board of E. F. Houghton & Co. and publisher of the company's popular external publication—The Houghton Line.

We'll deny the Major's right to call himself a "near editor." The success of his magazine (50 years old this year and circulated to 200,000 every month) won't let him get away with the title.

Popularity of The Houghton Line is all the more unique because it's been described as "breaking nearly every Madison Avenue advertising rule . . . (with) format, type face, and homespun editorial content (which) haven't changed since 1908 . . ."

The Major believes the book's main appeal is its "personal element." It represents, he points out, not what a company wants you to believe but what one man thought at the time he wrote it.

He writes about the things he knows about including (see photo) salt water fishing which landed a 535-pound tuna in the Bahamas.

Our congratulations to the Houghton Line and Major Carpenter.

Figuring the Odds

When the steel salesman goes out to land an order he usually battles tough odds.

American Steel & Wire Div. of U. S. Steel estimated just what its wire product salesmen are up against in the order sweepstakes. According to the American Iron and Steel Institute, they report, there are 58 other domestic producers of wire.

In terms of individual products, the number of manufacturers who make similar items to theirs run the odds up like this:

Cold finished bars:	43 to 1
Cold-rolled strip:	47 to 1
Wire Rods:	25 to 1
Rope and Strand:	24 to 1
Nails:	22 to 1
Welded Wire Fabric:	21 to 1
Cold Wound Springs:	19 to 1
Barbed Wire:	13 to 1
Woven Fence:	13 to 1

Bon Appetite!

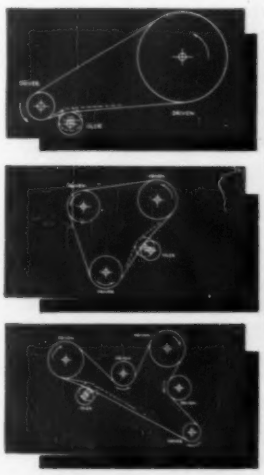
Mealtime took on a metalworking flavor when the National Open Hearth Steel Committee and the Blast Furnace, Coke Oven, and Raw Materials Committee got together recently.

This was the menu (or as they labeled it—the charging schedule) at their forty-first annual conference at the Hotel Statler:

Celery Seconds
Low Sulph Radishes
Periclase Olives
Fruit Cocktail Atomizer
Mushroom Soup a la Taconite
Bifurcated Prime Ribs of Beef
Roof String Beans
No. 2 Bundles Potatoes
Bath Immersion Salad
with
Group 3 Ore Dressing
Skulled Alaska
Java Dead Burnt Buns

How to drive it with Acme chain and sprockets

Acme Precision Roller Chains and Sprockets are easily adaptable for most any drive where maximum efficiency is essential, a few of which are illustrated below.



Acme Chains and Sprockets deliver Positive — Efficient — Economical — Flexible — Rugged — and Quiet Power Transmission. For the solution of your power transmission problems, send them to Acme.

Write Dept. 21-I for new illustrated 100 page catalog which includes new engineering section showing 36 methods of chain driving.

Acme Chain Corporation
HOLYOKE MASSACHUSETTS

ANOTHER INDUCTO INSTALLATION...

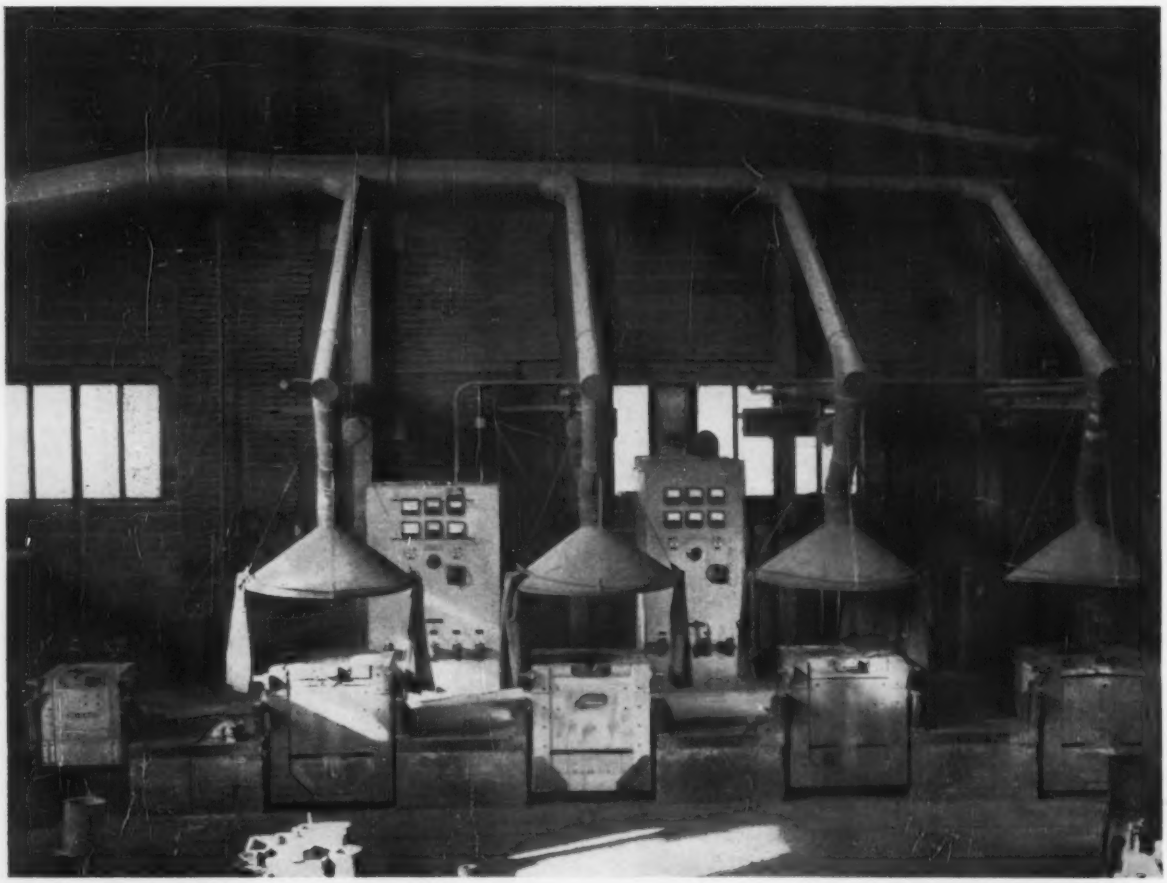


PHOTO COURTESY OF SORENSEN INDUSTRIES.

In Two Years Of Operation At Sorensen Industries, These INDUCTO Furnaces Saved More Than Their Cost

Since Sorensen Industries installed INDUCTO induction furnaces, they have reduced metal losses and minimized rejects. These benefits plus higher melting speeds have saved more than the cost of the furnaces in just two years of operation.

The installation includes four, 1000-pound furnaces which are operated from a 250 kw m-g set. A 50 kw m-g set is interlocked with the main unit so that it can maintain a molten bath in any of the four furnaces at holding temperatures. Four furnaces were used in this installation to eliminate contamination from one alloy to another.

You, too, can benefit from modern INDUCTO metal melting equipment. Want to know more? Write today. INDUCTO engineers will be glad to study your requirements. The Inductotherm Corporation, 412 Illinois Avenue, Delanco, New Jersey.

INDUCTOTHERM corporation

412 Illinois Ave. Delanco, N. J.

COMING EXHIBITS

Tool Engineers Show — May 1-8, Convention Hall, Philadelphia. (American Society of Tool Engineers, 10700 Puritan Ave., Detroit 38.)

Foreign Metalworking—May 7-17, Coliseum, New York. (U. S. World Trade Fair, 331 Madison Ave., New York 17.)

Western Material Handling Show—May 8-10, Great Western Exhibit Center, Los Angeles. Information: 2809 Sunset Blvd., Los Angeles 26.)

Southwestern Metal Show — May 12-16, State Fair Park, Dallas. (American Society for Metals, 7301 Euclid Ave., Cleveland 3.)

Foundry Show—May 19-23, Public Auditorium, Cleveland. (American Foundrymen's Society, Golf & Wolf Rds., Des Plaines, Ill.)

Packaging Show—May 26-30, Coliseum, New York. (American Management Assn., 1515 Broadway, New York 36.)

MEETINGS

MAY

Machinery Dealers National Assn. —Annual convention, May 5-7, Eden Roc Hotel, Miami Beach, Fla. Society headquarters, 1346 Connecticut Ave., Washington, D. C.

National Welding Supply Assn.—Annual convention, May 5-7, The Americana, Miami Beach, Fla. Society headquarters, 1900 Arch St., Philadelphia.

American Mining Congress—Coal convention, May 5-7, Netherland Hilton Hotel, Cincinnati, O. Society headquarters, Ring Bldg., Washington 6, D. C.

National Assn. of Sheet Metal Distributors—Spring meeting, May 8-9, Sheraton - Blackstone Hotel, Chicago. Society headquarters, 1900 Arch St., Philadelphia.

National Assn. of Purchasing Agents —Annual convention, May 11-14,

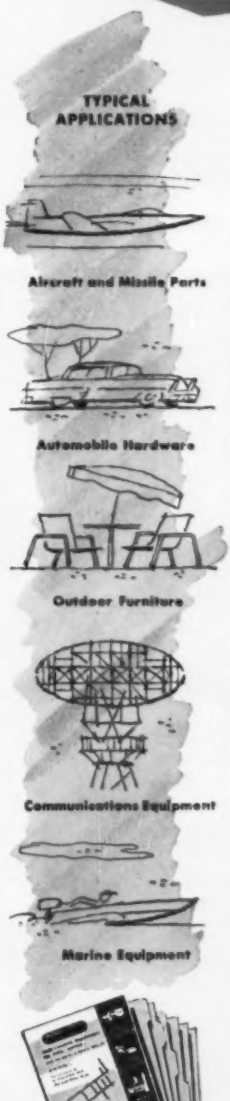
(Continued on P. 16)

look at these advantages of

IRIDITE® FINISHES

for

CORROSION-RESISTANCE, PAINT BASE on ALUMINUM and MAGNESIUM



EASE OF USE—Iridite is a simple chromate conversion treatment. Fast, easy, economical. You just dip, brush or spray it on the part at room temperature. No special equipment. No specially trained personnel.

OUTSTANDING PERFORMANCE—Forms a film that is an integral part of the metal itself. Can't flake, chip or peel. Takes paint firmly on initial application, and the bond lasts. Even protects areas scratched in use.

LOWEST COST—You have only minimum equipment cost, no special racks, high speed operation, lower overall handling costs.

CHOICE OF APPEARANCE—Clear coatings that retain metallic lustre to dark, maximum protection coatings. A variety of colors is available by dyeing.

IRIDITE #14 and #14-2 (Al-Coat) for ALUMINUM

Two specially formulated finishes that give you maximum latitude in aluminum treatment. Both provide excellent corrosion protection and paint base. Iridite #14-2 is an improved product that allows greater flexibility in operation and coating thickness and produces the optimum in corrosion protection.

Either coating provides corrosion resistance superior even to complicated electrolytic treatments in a fraction of the time. These coatings also offer many other valuable characteristics: they have low electrical resistance, they aid in arc-welding, provide a good base for bonding compounds, have no effect on the dimensional stability of close-tolerance parts. Final appearances ranging from clear through yellow iridescence to full brown can be obtained. By dyeing, you can produce red, green, blue, orange or yellow finishes.

IRIDITE #15 for MAGNESIUM

Produces a protective, paint base film with corrosion resistance at least equal to that obtained from long, high-temperature dichromate treatments in a fraction of the time and at room temperature. The appearance of the coating can be varied from light brown to dark brown and black.

APPROVED UNDER GOVERNMENT AND INDUSTRIAL SPECIFICATIONS

SEE FOR YOURSELF WHAT IRIDITE CAN DO . . . SEND SAMPLE PARTS FOR FREE PROCESSING. Look at the results, test the protection, evaluate the savings. Also write for handy Reference File of the most complete data published on chromate conversion coatings. Or, for immediate information, call your Allied Field Engineer. He's listed under "Plating Supplies" in your classified phone book.

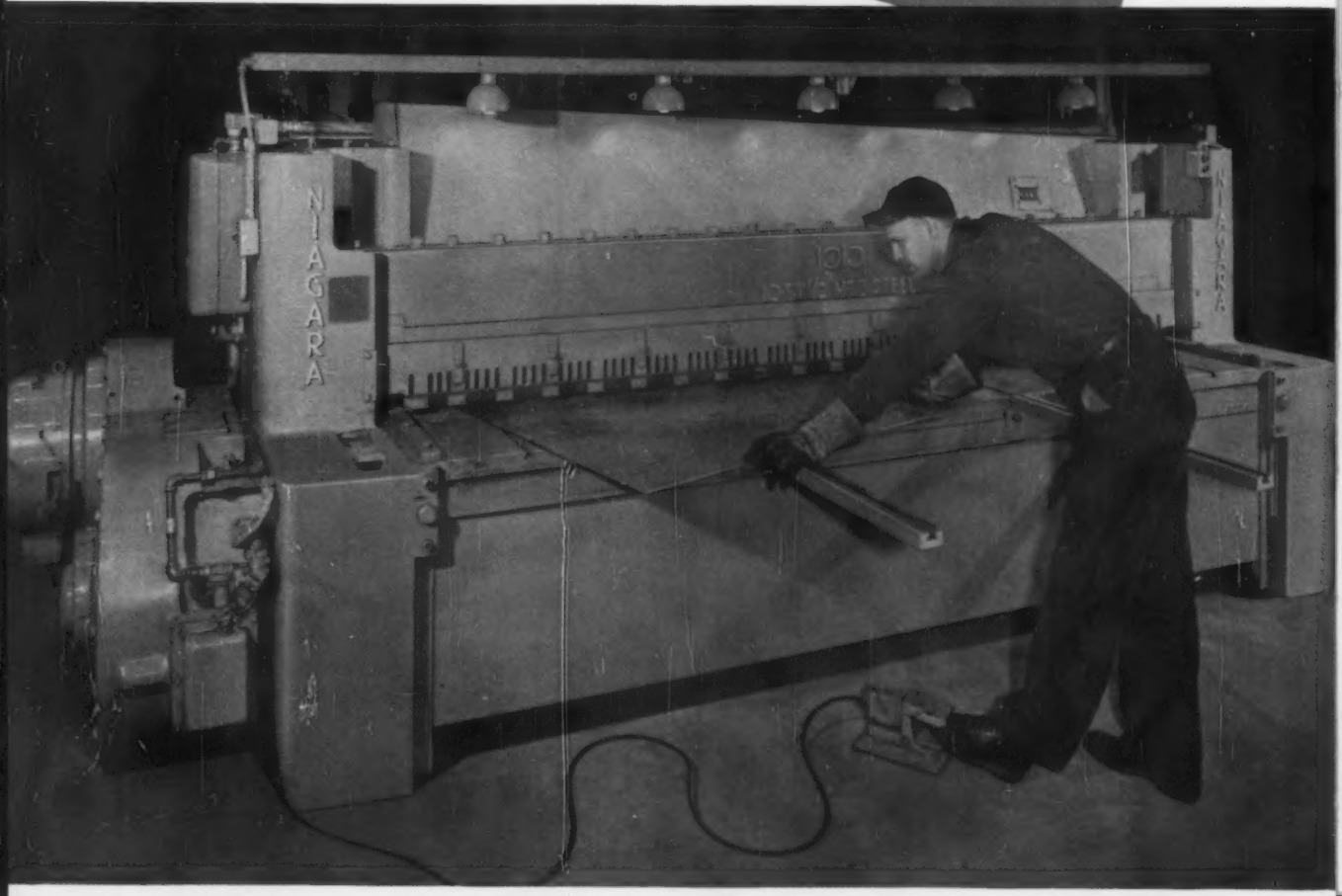
Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET

BALTIMORE 5, MARYLAND

Manufacturers of IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals — West Coast Licensee: L. H. Butcher Co.

Installation of finished platform pieces proceeds quickly and smoothly.



Niagara Model 1010 shearing 16 gage safety plate for operator's platform of Pneumatic Compactor.

NIAGARA

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

power squaring shears

"high accuracy ...utmost speed"

...sums up Seaman-Andwall's experience with Niagara Power Squaring Shears

Wisconsin manufacturer of road construction machinery uses Niagara Underdrive Power Squaring Shears to assure high quality and peak production.

Hard at work on America's highways, Seaman-Andwall compactors, rollers and other machines are opening the way to faster, safer travel.

Meanwhile, hard at work in the Seaman-Andwall plant, a Niagara Power Squaring Shear is opening the way to faster, more economical production.

"With Niagara's Shear in operation," says Seaman-Andwall, "we are able to cut 3 to 5 tons of steel per day. *The Niagara Shear gives us a high quality of accuracy with the utmost in speed and performance.*"

Seaman-Andwall is one of numerous plate and sheet metal fabricators who are making Niagara their choice for power squaring shears. And with good reason!

WHEN IT COMES TO ACCURACY, Niagara's positive, power-actuated self-compensating holddown contacts work with low impact, grips metal securely. Rigid, fully closed box section construction of bed, crosshead, holddown and housings resists all stresses with minimum deflection. Gaging facilities are ultra-accurate. Cutting within micrometer tolerances is assured.

WHEN IT COMES TO SPEED, more working strokes per minute, plus instant engagement of Niagara's exclusive sleeve clutch assure more cuts per hour. There's no need to adjust knife clearance for different thicknesses — holddown feet are self-compensating. Fully visible cutting line, ease of operation and quick-setting gages further boost hourly output.

WHEN IT COMES TO STAMINA, Niagara Shears are built to stand up on the toughest jobs. Simple design and minimum number of parts cut costly repairs. Vital drive components operate in a sealed bath of oil.

LEARN ALL ABOUT NIAGARA SHEARS IN THIS PICTURE-PACKED BULLETIN

See Niagara Shears at work in plants across the nation. Observe every feature, every detail. Learn why Niagara Shears can do the most for you. 74-pages — 141 revealing photographs and illustrations! 19 job photo reports! Specifications for 59 standard models. (Capacities: 16 gage to 1" mild steel. Cutting lengths: 4 to 20 ft.)

USE THIS COUPON FOR YOUR COPY BY RETURN MAIL

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N. Y.

Send your new Bulletin 69G on Niagara Underdrive Power Squaring Shears.

NAME _____ TITLE _____

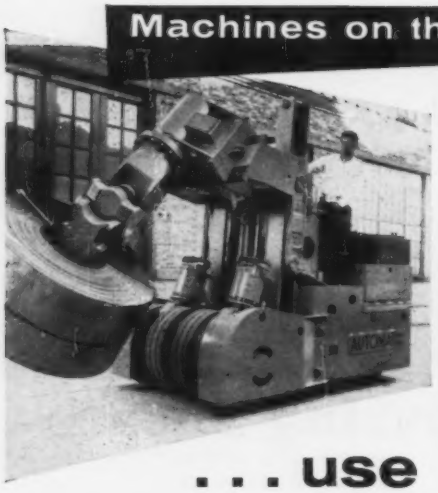
COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

IA

Machines on the move . . . . .



. . . use

FAIRFIELD GEARS!

POWER to operate these machines and countless others that you may see every day, travels *smoothly, efficiently, dependably* through FAIRFIELD GEARS. By specializing exclusively in "Fine Gears Made to Order", Fairfield has become one of America's largest independent producers of these parts.

If you use gears in the product you make, we believe it will pay you, as it has others, to become acquainted with FAIRFIELD—the place where fine gears are produced to meet your specifications EFFICIENTLY, ECONOMICALLY! Fairfield's production facilities are unexcelled. *Call or Write.*

FAIRFIELD MANUFACTURING CO.

2319 South Concord Road • Lafayette, Indiana

TELEPHONE: 2-7353

A "PLUS VALUE" IN ANY PRODUCT

Gears and Differentials for FINE GEARS *Made to Order for:*

TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

EXHIBITS, MEETINGS

(Continued from P. 13)

Conrad Hilton Hotel, Chicago. Society headquarters, 11 Park Place, New York.

American Steel Warehouse Assn., Inc.—Annual meeting, May 11-14, Riviera Hotel, Las Vegas. Society headquarters, 540 Terminal Tower, Cleveland.

Instrument Society of America—Annual symposium on instrumental methods of analysis, May 12-14, Shamrock-Hilton Hotel, Houston, Tex. Society headquarters, 313 Sixth Ave., Pittsburgh.

Society for Experimental Stress Analysis—Spring meeting, May 14-16, Manger Hotel, Cleveland. Society headquarters, P. O. Box 168, Cambridge, Mass.

Industrial Heating Equipment Assn., Inc.—Spring meeting, May 18-21, The Homestead, Hot Springs, Va. Society headquarters, 1145 19th St., N. W., Washington, D. C.

American Electroplaters' Society—Annual convention, May 18-22, Sheraton-Gibson Hotel, Cincinnati. Society headquarters, 6265 Wiehe Rd., Cincinnati.

Non-Ferrous Founders' Society—Annual meeting, May 19-21, Carter Hotel, Cleveland. Society headquarters, 1604 Chicago Ave., Evanston, Ill.

Farm Equipment Institute—Spring industry meeting, May 22, LaSalle Hotel, Chicago. Society headquarters, 608 S. Dearborn St., Chicago 5, Ill.

JUNE

American Gear Manufacturers Assn.—Annual meeting, June 1-4, The Homestead, Hot Springs, Va. Society headquarters, One Thomas Circle, Washington, D. C.

A large diameter steel head takes form on one of Claymont's spinning machines—units that turn out heads up to 19 feet in diameter, in ferrous and non-ferrous metals. Integrated facilities make Claymont a reliable source of quality steel plate and plate products for industry.

by d'Arazien

CLAYMONT SPUN HEADS

CF&I

CHECK CLAYMONT FOR—Alloy Steel Plates • Carbon Steel Plates • Stainless-Clad Steel Plates High Strength Low Alloy Steel Plates • CF&I Lectro-Clad Nickel Plated Steel Plates • Pressed and Spun Steel Heads • Manhole Fittings and Covers • Fabricated Steel Products Large Diameter Welded Steel Pipe

PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION • THE COLORADO FUEL AND IRON CORPORATION

Plant at Claymont, Delaware • Sales Offices in all Key Cities

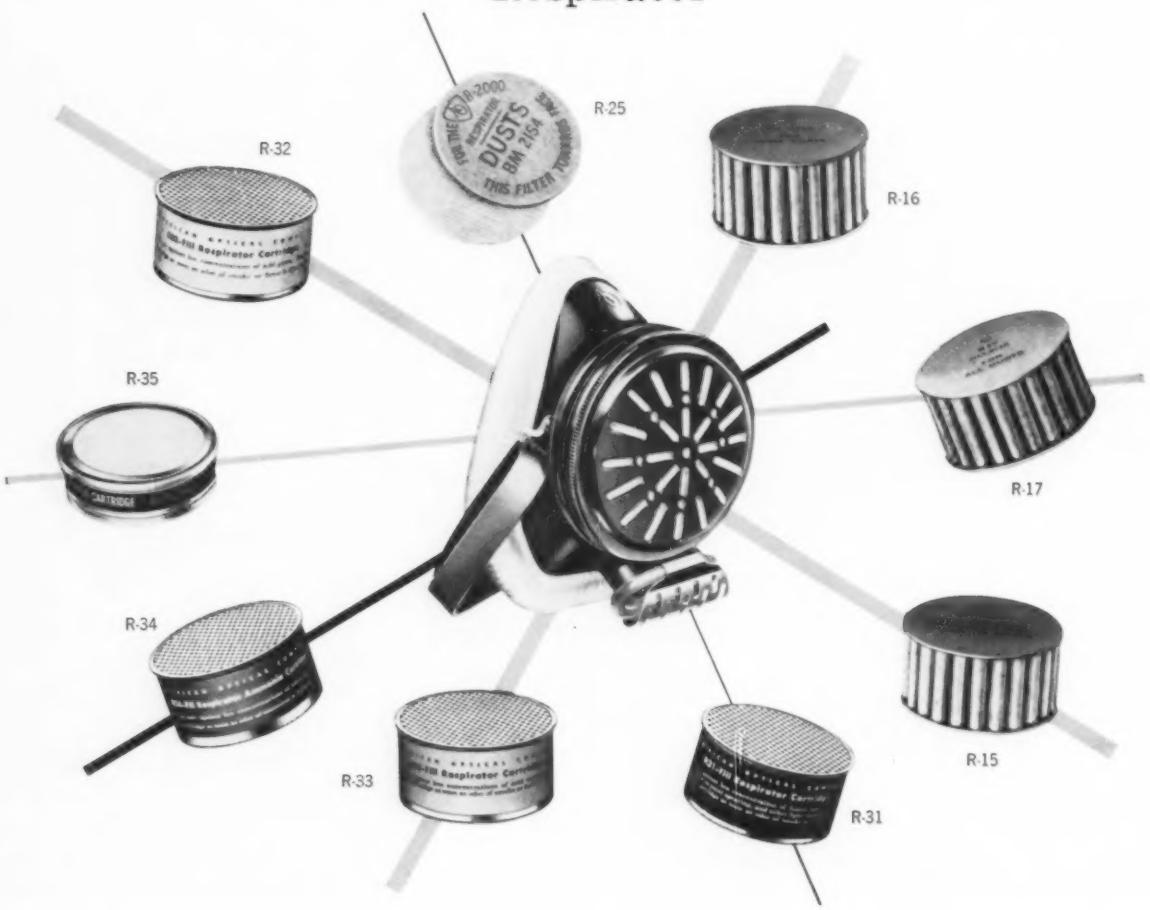
5745

~~8~~ in 1

Respirators

Now...9 in 1!

Inventory Saving, Cost Saving AO R-2000 Series Respirator



Yes, with the addition of the NEW R-35* Cartridge (and other cartridges and filters), the AO R-2000 can be quickly converted to one of nine respirators for protection against a multitude of dust, gas and vapor hazards — singly or in combination.

*Recommended for exposures to low concentrations of All Dusts not significantly more toxic than lead and Organic Vapors simultaneously.

Your nearest American Optical Safety Products Representative can supply you. Always insist on ® trademarked safety products.

AO Sweatbands keep workers cool, comfortable, efficient, prevent accidents. Check your stocks.

American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS
Branches in Principal Cities

AMERICAN ORIGINALS IN IRON AND STEEL

Iron pots from oyster shells?

It was an anxious community that watched the firing of this country's first successful iron furnace during 1644 at Saugus, Massachusetts. Months of toil and the risk of precious funds were involved.

Not only were many observers awed by the great stone furnace, they were puzzled by the delicate mold fashion by the skilled iron founder, Joseph Jenks. Puzzling, too, must have been the dumping of alternate layers of ore and oyster shells into the flaming blast. "How do they make iron from oyster shells?" many may have asked. Of course, the shells were merely the iron maker's ingenious substitute for the limestone necessary to remove the impurities from the ore.

Excitement mounted like the furnace temperatures as the molten iron was tapped into the waiting mold. Finally, when the mold was broken, a tiny cooking pot was held aloft . . . the first infant product of an infant industry, now grown to be the largest of its kind in the world.

We at The J. E. Baker Company are proud of the part we have played in the further development of the iron and steel industry. For many years, Baker's Magdolite and Jebcolite have provided greater furnace efficiency and more uniform ingots at lower refractory costs. They are always five ways better: in composition, preparation, strength, economy and quality.

ANOTHER AMERICAN ORIGINAL

JEBCO
PRODUCTS
SINCE 1889

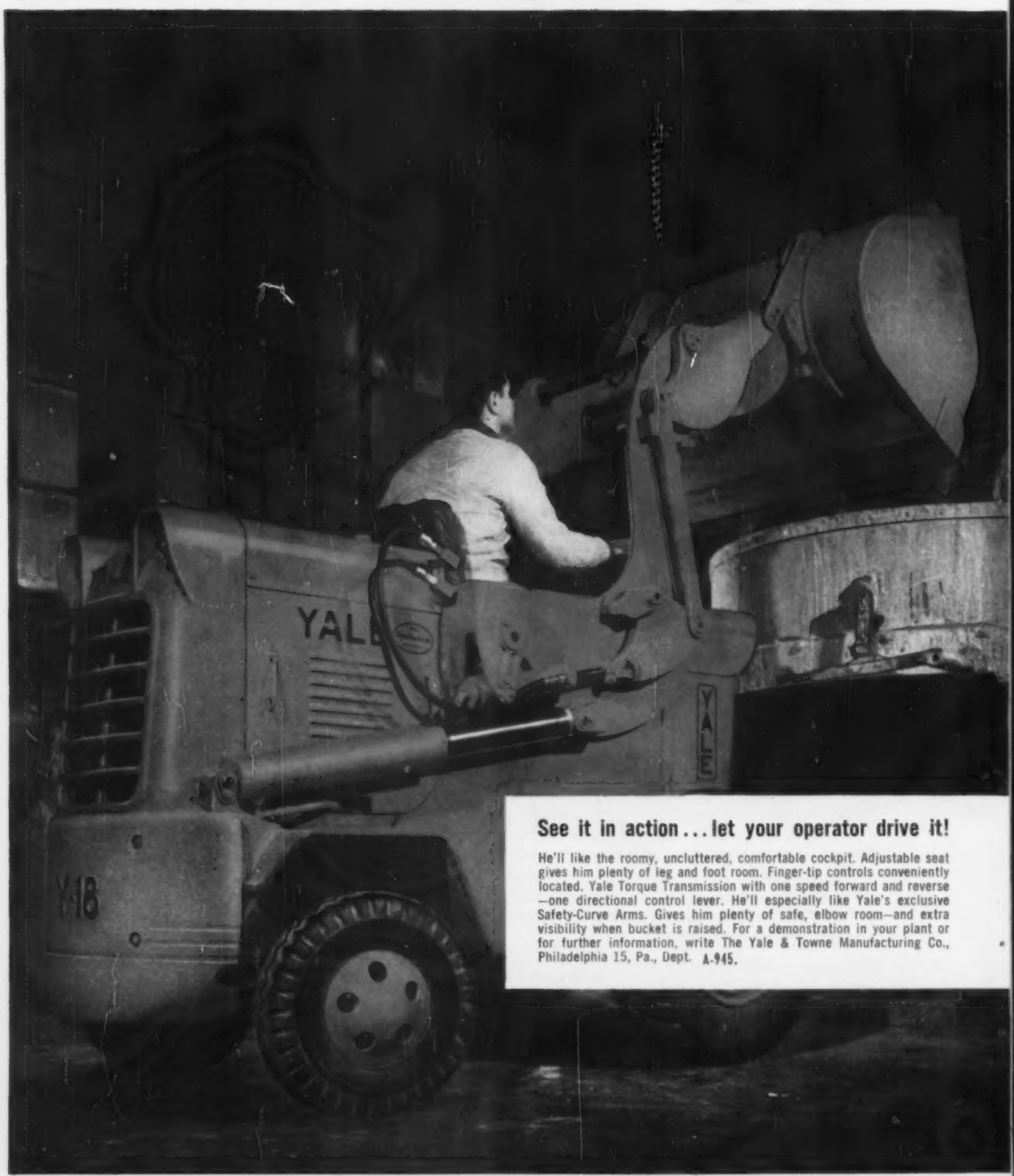
BAKER'S MAGDOLITE
The original dead-burned dolomite

THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA • PLANTS: BILLMEYER, YORK, PENNSYLVANIA • MILLERSVILLE, OHIO

YALE introduces...the INDUSTRIAL tractor shovel

DESIGNED TO GIVE YOU 25%



See it in action... let your operator drive it!

He'll like the roomy, uncluttered, comfortable cockpit. Adjustable seat gives him plenty of leg and foot room. Finger-tip controls conveniently located. Yale Torque Transmission with one speed forward and reverse —one directional control lever. He'll especially like Yale's exclusive Safety-Curve Arms. Gives him plenty of safe, elbow room—and extra visibility when bucket is raised. For a demonstration in your plant or for further information, write The Yale & Towne Manufacturing Co., Philadelphia 15, Pa., Dept. A-945.

MORE WORK EVERY HOUR

through these exclusive Yale features . . .

- Yale Torque Transmission (fully automatic)
- 45° ground-level bucket tipback
- Safety-curve arms
- Accelerates to operating speed of 8 mph. in 3.5 seconds—to a speed of 13 mph. in 5.5 seconds
- 6 foot dumping clearance
- Sealed brakes
- Front and rear operating lights

At last—a tractor shovel designed especially for industry! Whether you handle bulk chemicals, sand, gravel, scrap or raw materials, you'll get more productive work at less cost per work unit with this new concept in a tractor shovel.

Yale designed it for tight areas—built it *compact* (only 117" overall length) so that it can maneuver in any aisle wide enough for a wheelbarrow. *Accelerates to an operating speed* of 8 mph. in 3.5 seconds and to a top speed of 13 mph. in 5.5 seconds. Exclusive *Yale Torque Transmission (fully automatic)* permits quicker, smoother starting, eliminates shifting, provides more power under load conditions—in a word, *speeds cycle operations.* This extra speed, plus the greatest carrying capacity of its class (full 2500 lbs.) means *up to 25% more work per hour.*

Yale's loader-linkage design offers unique advantages. Exclusive 45° *Ground-Level Tipback* insures the ultimate in loading action—and a grade-level carrying position to minimize spillage. Exclusive 6 foot *Dumping Clearance* is highest on any model of similar wheelbase. Bucket is *Automatically Self-Locating.* Operator merely lowers from full dump-position to ground-level—bucket automatically returns to digging position.

a product of Yale's integrated design—these engineering advances are standard features

- Gasoline; LP-Gas powered
- Sealed hydraulic system—keeps dirt out
- Pre-cleaner—air cleaner combination
- Extra strong heavy welded steel frame—greater safety, longer life
- Automatic bucket return to digging position
- Carrying capacity of 2500 lbs.—bigger load capacity
- Short wheel base—minimum turning radius
- Sealed generator and distributor
- Balanced weight distribution
- Maximum speeds up to 13 mph.

YALE* *REG. U.S. PAT. OFF

INDUSTRIAL LIFT TRUCKS & TRACTOR SHOVELS • HOISTS

YALE & TOWNE

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • INDUSTRIAL TRACTOR SHOVELS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.; FORREST CITY, ARK.

Problem-Solving Products from Republic

MEET REQUIREMENTS FOR DEPENDABILITY, STRENGTH, ECONOMY, CLOSE TOLERANCE

U.S. Axle shafts and connecting links made from Republic Alloy Steel assure dependability in operation of Euclid TS-24 twin-power scrapers.

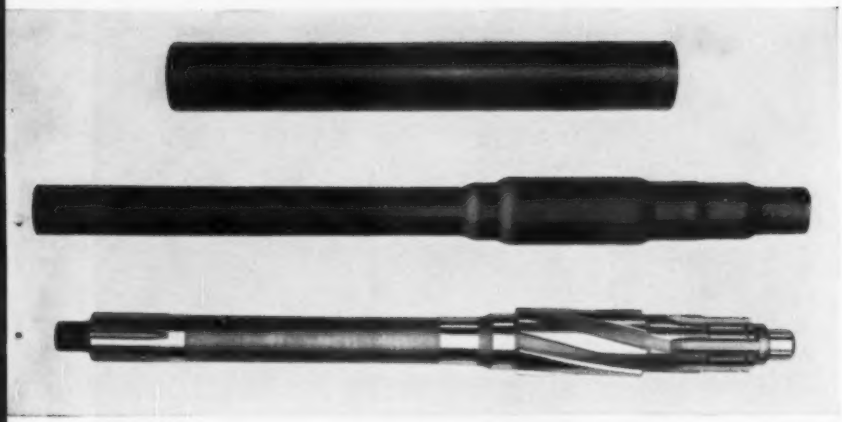
REPUBLIC ALLOY STEELS ADD DEPENDABILITY, TOUGHNESS, STRENGTH, QUALITY TO A PRESTIGE PRODUCT. Axle shafts and connecting links produced by The U.S. Axle Company, Inc., Pottstown, Pennsylvania, are known throughout the world for their extra stamina to withstand emergencies as well as everyday use.

To maintain their reputation for quality and dependability, U.S. Axle specifies only the finest materials, including Republic 4300 series hot rolled Alloy Steels.

These finest of steels provide the high strength, toughness, shock-resistance, and abrasion-resistance values needed to withstand the severe service to which the shafts and links are subjected. Alloy Steel's uniform response to heat treatment gives these parts hard surfaces around tough cores, providing maximum resistance to abrasion, friction, and wear.

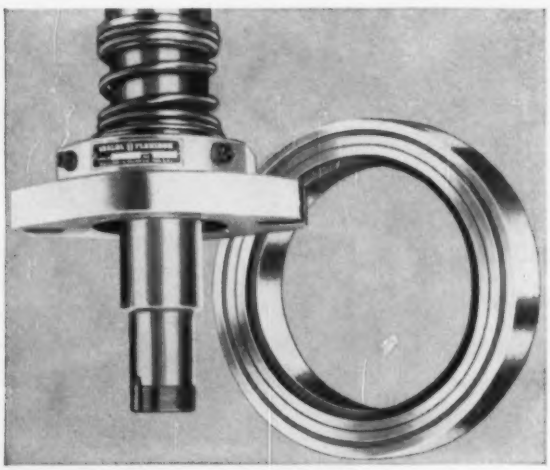
In Republic Alloy Steels you will find the highest strength values—plus an exceptionally high strength-to-weight ratio that permits the design of thinner sections to save weight and hold down size without any sacrifice of needed strength.

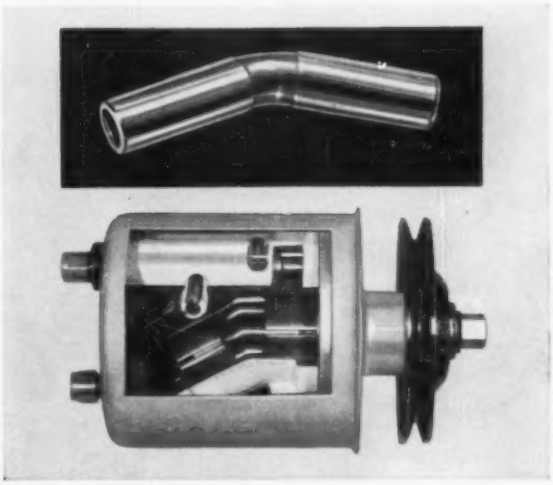
Specify Republic Alloy Steels to insure safety, to extend equipment life, to cut maintenance and replacement costs. Specify Republic Alloy Steels where strength and toughness must resist heavy-duty roughness. We offer you the services of our experienced field metallurgists to help you get the most from these versatile steels at the lowest possible cost. The coupon is your invitation to their services.



REPUBLIC DIE-FORM MEANS ECONOMY. This new fabricating process can save you 1 out of 3 tons of steel. The automotive transmission shaft, shown at left, proves the point. Using Die-Form, 200 tons of cold finished blanks produced parts formerly requiring 300 tons. Die-Form is a new method of cold forming hot rolled carbon, alloy, or stainless steel bars into multi-diameter blanks ready for final machining. It permits major savings in time, material, and money in mass produced, multi-diameter machine shafts. Since Die-Form closely approximates the final part, only finishing cuts and/or grinding are required for completion. Scrap loss is minimized—production rate increased. Send coupon for booklet describing the advantages of this new process.

REPUBLIC ENDURO® STAINLESS STEEL BARS provide a machine finish that looks as good as a ground finish. That's the performance report from machine operators at Sealol Corporation, Providence, Rhode Island. The company uses Free-Machining ENDURO bars in manufacturing mechanical shaft seals for application on fuel tankers, and in the aircraft, petroleum, food and chemical industries. The Sealol machine operators also report that they like the machinability of ENDURO bars—the fine surface finish, the accuracy of section, the uniform soundness, the ability of ENDURO to hold close tolerances. Send coupon for complete facts on Free-Machining ENDURO Stainless Steel Bars.





REPUBLIC ELECTRUNITE® MECHANICAL TUBING meets all close tolerance requirements for new automotive pump (above). The unusual ductility, uniformity, and workability of ELECTRUNITE Mechanical Tubing also meets the performance requirements of this hydraulic power pump designed and assembled by Thompson Products, Inc., Cleveland, Ohio. Will-O-Hill Industries, Inc., Willoughby, Ohio, subcontractor and specialist in close tolerance tubular stampings, cut 7/16-inch diameter ELECTRUNITE into units 2 3/16 inches long. Each unit is rolled to form a slight groove in the center, and bent to an angle of exactly 150°. Both ends are subsequently bent in a die, held to a tolerance of ± .0005 inches and finished to an O.D. to ± .0003 inches. Republic Engineers will work with you in solving precision problems and reducing costs with ELECTRUNITE Mechanical Tubing. Send coupon today.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. IA-5292
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Send more information on:
☐ Die-Form ☐ ENDURO Stainless Steel Bars
☐ ELECTRUNITE Mechanical Tubing
☐ Have an Alloy Metallurgist call.

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State____

time saved is . . .

money earned

BULLARD

The application of Bullard Mau-Au-Trol Vertical Turret Lathes, Model 75, to the machining of aircraft turbine compressor cases clearly demonstrates the superiority of automatic operation.

According to Mr. George E. Saupe, Chief Manufacturing Engineer at Solar Aircraft Co., San Diego, California, these are some of the advantages:

1 Spoilage practically eliminated.

2 Machining time reduced from 14 hours to 1 hour and 42 minutes per unit.

3 In process inspection unnecessary.

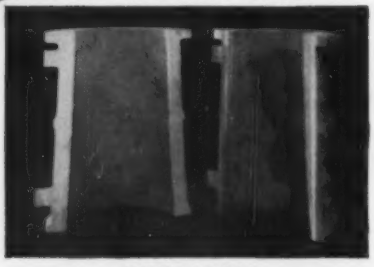
4 Better production control.

5 Reduces error of the operator.

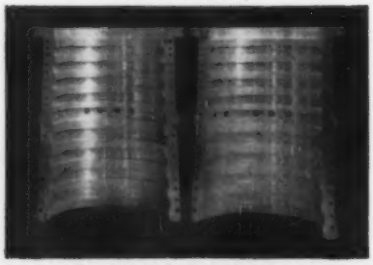
6 Less work in process inventory.

A call, to your nearest Bullard Sales Office or Distributor, can be your first step toward time saved and money earned with your machining problems.

SOLAR JUPITER COMPRESSOR CASE



ROUGH PIECE



FINISHED PIECE

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

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A. B. Dick Company
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a man who came

"I first heard of the JIGMIL Technique for boring accurate holes in precise locations at an engineering lecture-meeting in Philadelphia. What I heard made me curious because the story seemed exaggerated."

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McNally-Pittsburg Mfg. Corp.
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Oster Manufacturing Co.
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Rockford Machine Tool Co.
S & S Corrugated Paper Machy. Co.
Stacy Machine Works, Inc.
Sunnen Products Company
George W. Swift, Jr., Inc.
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"I accepted an invitation to go to Fair Street and there saw the JIGMIL Technique in operation doing jigless boring to degrees of economy and precision that verified what I had heard in the lecture. The gains that were apparent from the analysis made for us by the DeVlieg engineers caused us to purchase a number of JIGMILS. These machines have been in use for several years. We have experienced many advantages. The principal ones are improved quality and a considerable reduction in machining, inspection and assembly times. The quality of the work resulting from the outstanding JIGMIL accuracy has had a far-reaching improving effect on the general quality and performance of our product."

A. O. HOLMBERG

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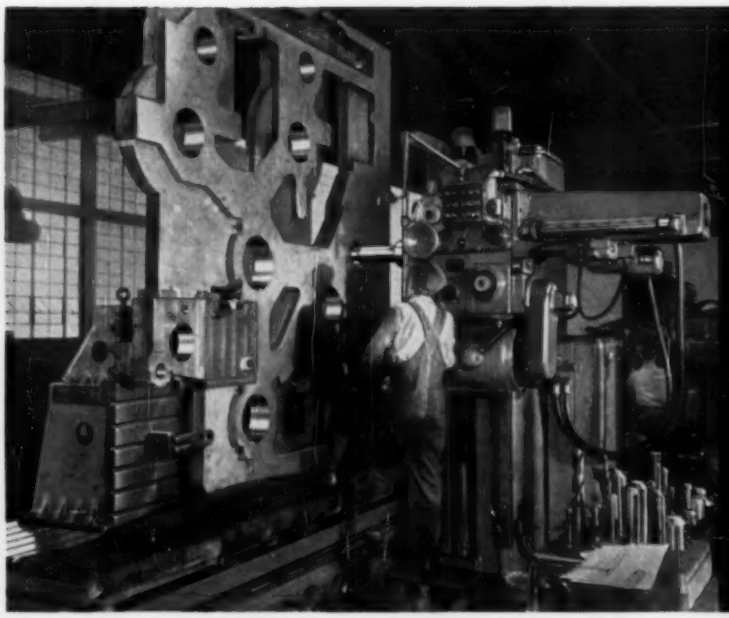

A FEW PROVEN ADVANTAGES OF THE JIGMIL TECHNIQUE—

- Eliminates cost of expensive jigs and production delays resulting from their manufacture.
- Simplifies tooling.
- Employs automatic functions to reduce factors of human error even in close tolerance work.
- Makes possible greater flexibility of product design.
- Improves end product by permitting interchangeable assembly of parts without hand fitting.
- Increases production and product accuracy.

ACCURACY IS AN ECONOMY!

A TYPICAL EXAMPLE OF JIGMIL ACCURACY

Goss uses the JIGMIL Technique for boring components of their famous high-speed newspaper, magazine and color printing presses. Illustrated above is one of the side frames for an 80 ft. multi-color press recently built by Goss. This part was bored on a Model 4B-120 SPIRAMATIC JIGMIL. JIGMILS were used for boring approximately 2260 holes in the side frames and gear boxes for this press. In the assembled press, the accuracy of hole size and spacing made it possible to hold the register of 5 colors within .001".

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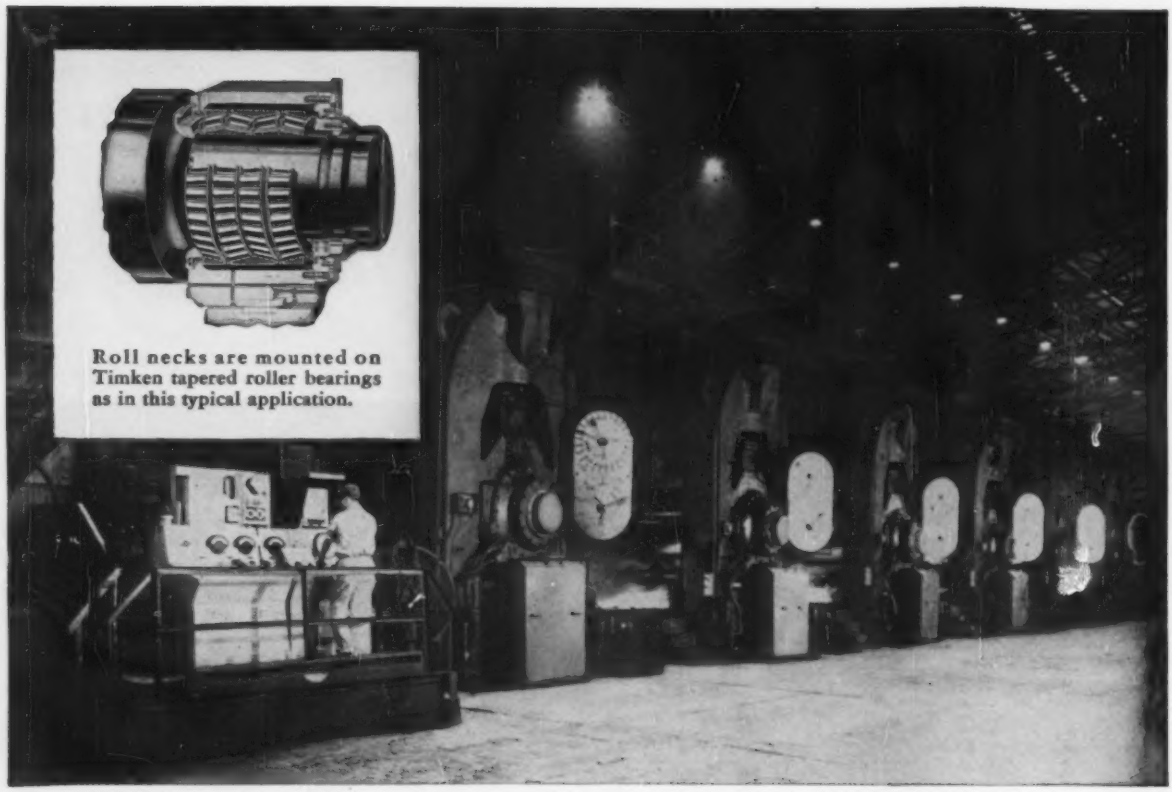


Roll necks are mounted on Timken tapered roller bearings as in this typical application.

New design TIMKEN® work roll bearings average 75% more tonnage than previous design on hot strip mill

TO take the loads of high speed production and reduce mill delays, a Midwestern steel mill installed a new design of Timken® bearings on the work rolls of its 4-high 80″ continuous hot strip mill. By the end of 1955, production figures revealed that the new design Timken bearings averaged 75% more tonnage in the fixed position—where service is most severe. This increased tonnage came from increased radial and thrust capacity in these new bearings. The net result was a substantial reduction in bearing cost. And this new design made higher performance possible with no increase in space. It's another example of how Timken Company engineering can help cut costs and reduce mill delays.

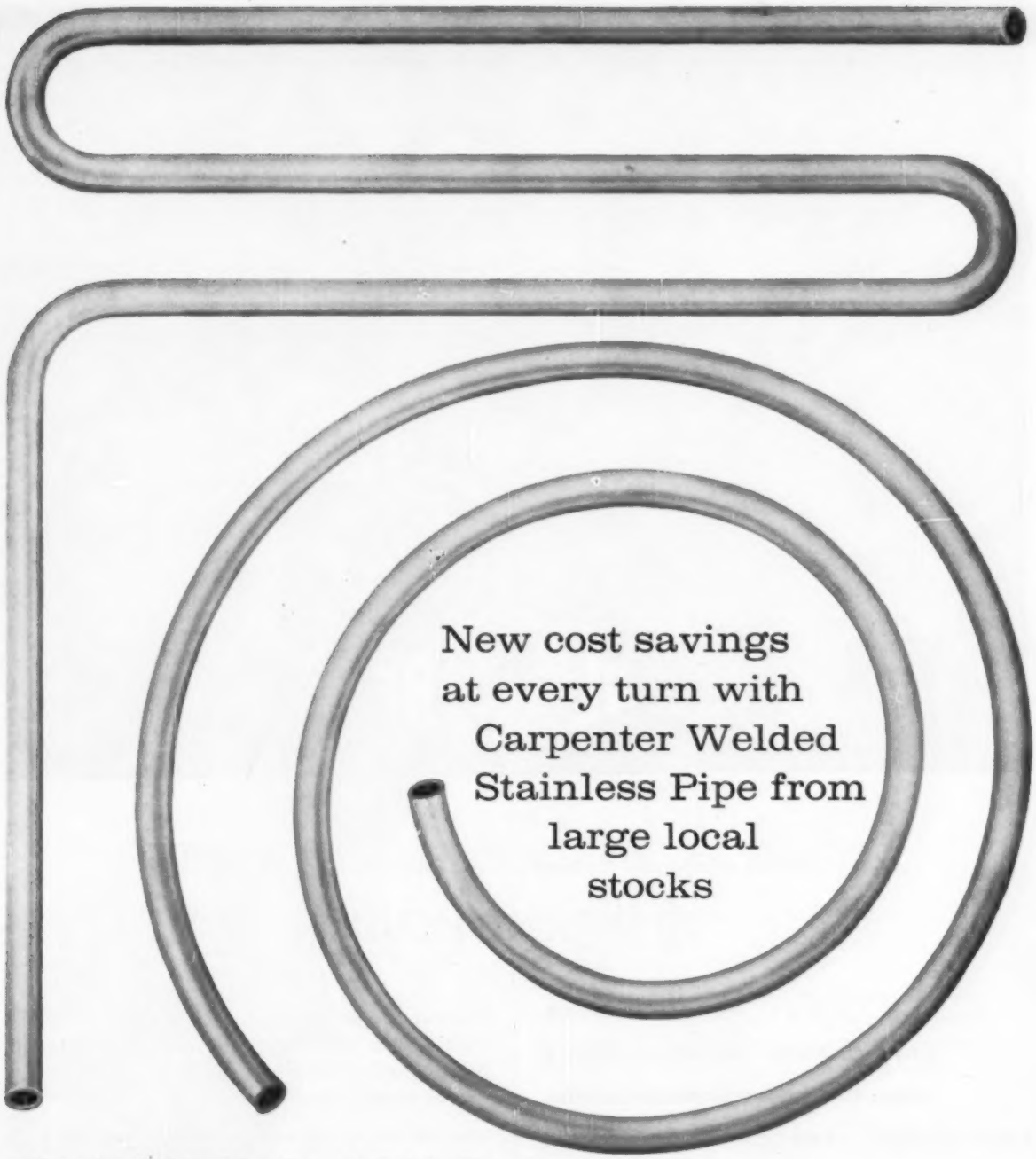
These new design Timken work roll bearings are compiling amazing records because 1) Timken advanced engineering designed these bearings for the job. 2) They were precision-manufactured for longer life. 3) Their true rolling motion, made possible by the tapered design and smooth surface finish, practically eliminates friction. Performance records compiled by mill operators everywhere prove Timken work roll bearings provide minimum cost per ton of steel rolled.

So, to minimize mill downtime with correspondingly lower operating costs, be sure you specify Timken tapered roller bearings in the mill equipment you build or operate. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD



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Weld questionable steels with . . .

JETWELD LH-70

- *Outstanding overhead and out-of-position operation*
- *High physical properties*
- *Fast, easy iron powder action*

Jetweld LH-70 operates overhead with the smooth, fast action—and has the high physical properties of a low hydrogen rod.

Produces crack-free welds on heavy plate with a minimum of stress relieving. Reduces the need for preheat on medium carbon steels—makes porosity free welds on sulphur bearing steel.

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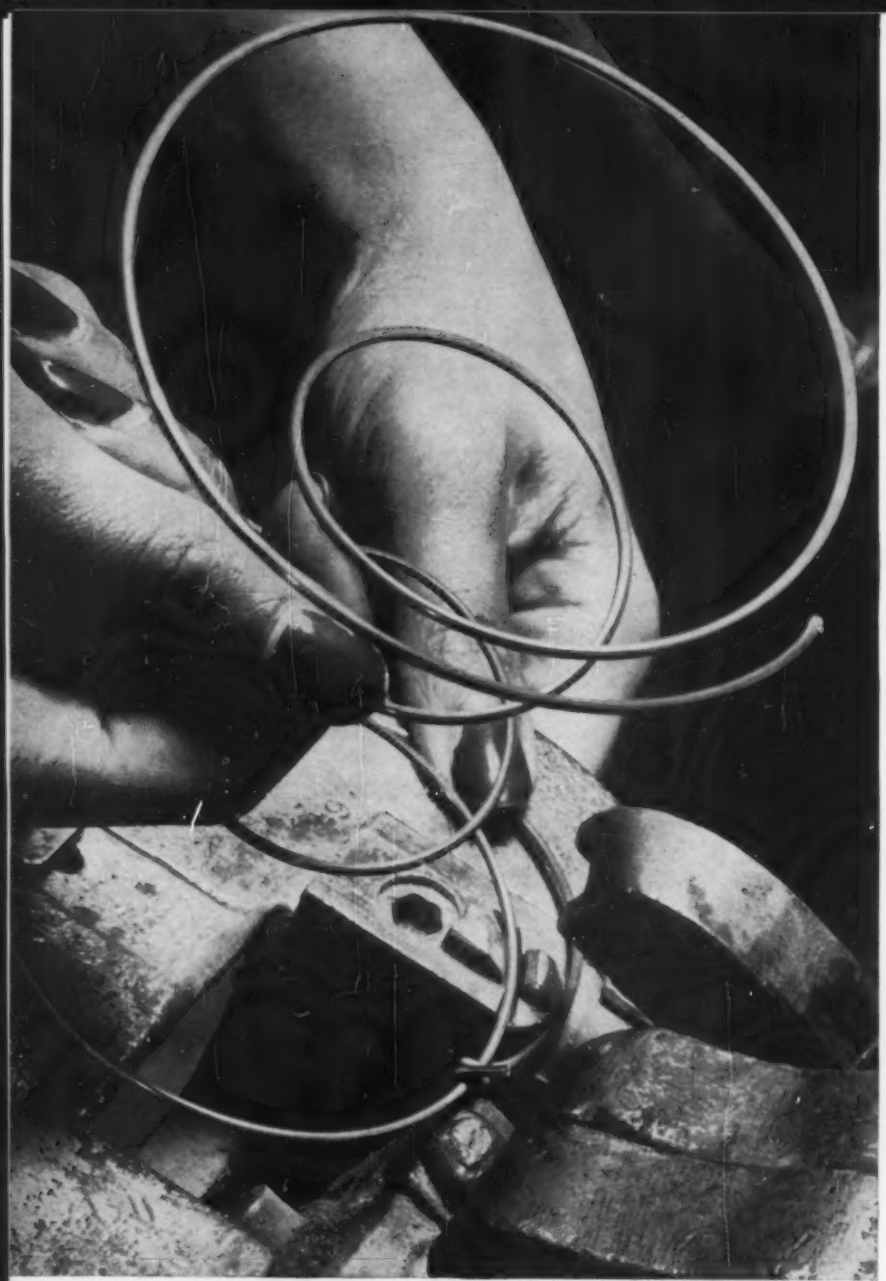


Tough test for Pittsburgh Steel's upholstery wire at Piedmont Spring Co. comes in coiling and knotting spring. Wire that is too hard will break; wire too soft will lose springiness even after tempering. Uniform quality of Pittsburgh Steel wire insures uninterrupted production.

Pittsburgh Steel wire adds years of life to upholstery springs

Piedmont Spring Company calls Pittsburgh Steel upholstery wire "Best we've ever seen"

Pity the poor upholstery spring . . .

It goes through the most torturous stresses and strains just getting made. Then, fully formed and ready for use, all it can look forward to are years and years of supporting tons of jumping, running, standing, sitting or just-lounging human weight.

If that upholstery spring is unappreciated, then consider how underrated its wire can be. You have to be a veteran upholstery springmaker to know what it takes to make a first rate spring that can outlast the furniture it serves.

Such men are Bill and Bob Gaston of Piedmont Spring Company, Hickory, N.C. They choose only superior quality wire—like that supplied by Pittsburgh Steel Company. During their 31 years of combined springmaking experience, the Gaston brothers have seen just about every twist and turn there is to springmaking. Bill Gaston, who handles purchasing, sums up Pittsburgh Steel upholstery grade wire this way:

"Pittsburgh Steel wire is the best we've seen anywhere. And I'd tell that to anyone. It's exactly what a manufacturer needs in this business. We get uniform quality in every shipment."

Combination of quality Pittsburgh Steel high carbon upholstery wire and precision springmaking gives Piedmont upholstery springs enough liveliness and durability to serve several generations of furniture owners.

Liveliness—a must in an upholstery spring—can be seen when the finished spring is compressed. If it springs back to within one-quarter of an inch of its original length, say nine inches in a frame spring, then it has the quality to take years of hard use.

Upholstery wire from Pittsburgh Steel also must be able to withstand severe deformation during coiling and knotting.

Proper grain structure is another must. Too hard—the wire will break, scrapping an entire coil. Too soft—the wire will coil and knot easily—but it will be lifeless even after tempering. Plant Superintendent Bob Gaston cites another all-important requirement:

"The wire we use must have uniform diameter—only .001 variation plus or minus allowed up to .075-inch and .002 variation for .076-inch and larger. If the wire didn't meet our close tolerances, it would seriously damage our coiling machines and stop production. And you know what that does to costs and lost orders. But there's no worry there with Pittsburgh Steel wire."

Piedmont Spring also uses Pittsburgh Steel's border and brace low carbon wire for edgewire frames that hold cushion springs. This wire must be able to withstand crimping and bending and have enough stiffness to support the finished unit. High carbon upholstery grade wire—.047 to .155-inch diameter—is transformed into cushion, back and frame springs. Lacing wire is used to join springs together in cushion and back frames.

Bill Gaston gives much of the credit for his company's enviable spring reputation and low production costs to wire from Pittsburgh Steel. He states flatly:

"We've never had a complaint from a customer because of the quality of the wire. It has never failed to meet our specs."

"And there's another thing I like about Pittsburgh Steel's performance," Bill adds. "That's the service. We keep a low inventory of wire. Many times we run to the bare minimum, but we always get our shipments on time to keep production going.

"When we want to talk to Pittsburgh Steel's district sales office, we get quick attention from the district manager himself right on down.

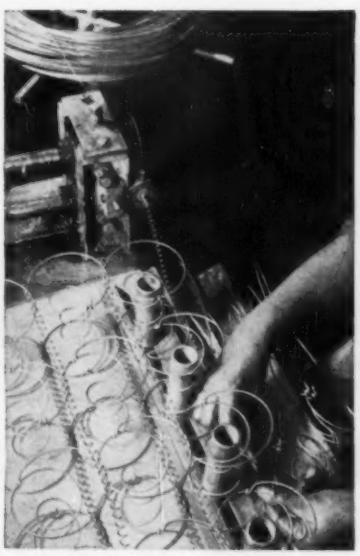
"Our aim at Piedmont is to make only the best upholstery springs—springs that will take years of hard use without failure. And we get them thanks to the most important ingredient in a spring—quality wire like ours from Pittsburgh Steel."

These same benefits from Pittsburgh Steel's upholstery grade wire can be yours, too. And they don't stop with upholstery wire. Oil tempered wire, bright basic, core wire, ACSR wire, rope wire, high carbon MB spring wire or any other kind of manufacturers' wire are available to serve your needs.

Trained Pittsburgh Steel engineers are close at hand to put their knowledge and experience to work in helping solve your problems.

Specify Pittsburgh Steel wire. Call the nearest district sales office listed at right. Do it today.

"Best wire we've ever seen" comments Bob and Bill Gaston (left and center) about high carbon upholstery grade wire from Pittsburgh Steel. The two owners of Piedmont Spring Co. check the life in a Piedmont upholstery spring after tempering. After compression, spring must return to within one-quarter of an inch of original length.



Cushion springs are joined together by lacing wire, forming the shape of a cushion frame for an upholstered chair. Piedmont springs made of Pittsburgh Steel wire take years of hard use.

Baling for shipping, Piedmont upholstery springs are compressed to save space. Bill Gaston says, "We've never had a complaint from a customer because of the quality of the wire."

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

Atlanta	Cleveland	Dayton	Los Angeles	Pittsburgh
Chicago	Dallas	Detroit	New York	Tulsa
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ND FACTS

This big idea really gets around!

Good ideas get a lot of "mileage"! Take this special automotive bearing pioneered by New Departure. Its unique advantages have been proved by billions of miles in millions of cars and trucks. But "miles-in-use" doesn't begin to tell the story of fan and water pump shaft ball bearing. For design engineers in other fields were quick to spot this bearing's versatility.

So today this New Departure sealed and lubricated-for-life bearing with integral shaft eliminates bearing upkeep costs and simplifies design in a wide variety of familiar products—from home appliances to industrial tools.

If you need help with a big design idea, call or write for consultation with a New Departure ball bearing application engineer.

1908–1958
GM
FORWARD FROM FIFTY

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DIVISION OF GENERAL MOTORS, BRISTOL, CONN.
NOTHING ROLLS LIKE A BALL

Cast Powder Without Press

Slip casting of metal powder permits making of parts without expensive dies or compacting presses. All that's required is a low-cost mold. Chemicals are added to a liquid dispersion of metal particles to prevent non-uniform settling. While sintered densities are the same as those for conventionally prepared parts, better grain structure leads to improved physical properties.

Stampers Buck Mergers

Small independent metal stamping shops have resisted the merger trend and prospered because they've improved products, Government officials say. And they explain that other small businesses, especially when aided by geographic factors, might profit and keep their independence the same way—by working a little harder at improving product utility and quality.

Ceramics for Design Check

Ceramic-type brittle coatings are helping metal casters improve design of parts. The new coating is fired on in a few minutes at 1000°F. Design defects then show up in coating during stress testing. Several firms report good results in pointing way to design improvement.

Stress Corrosion Cracking

Field tests have proved the resistance of a new aluminum bronze alloy to stress corrosion cracking. There's no need for stress relief. Field changes, alterations or repairs can be made without heat treatment. It's the precise addition of ⅓ pct of either tin or silver to the patented alloy that eliminates corrosion.

Modernize Tools

A national survey by a large tool producer shows a big market for machine tool modernization. Almost half the machines used by the companies studied are not suitable for carbide cutting tools. About one out of five units could be tooled with carbides, but isn't. While nearly half of the machines used by transportation equipment makers are tooled with carbides, only 15 pct out of a possible 36 pct are so tooled in the fabricated metal products industry.

Vapor-Shielded Welding

It's different from submerged-arc and gas-shielded methods because no fluxing or shielding agents are added from external sources. The wire electrode itself produces a vapor to shield the open arc. The new automatic process can reach speeds of 300 ipm on 14-gauge lap welds. Weld speeds on 3/16-in. plate range about 100 ipm.

Choice for Wear

A familiar, but rarely used alloy may be the ideal wear-resistant metal for an all-aluminum automotive engine. It's aluminum with more than 20 pct silicon added. Recently developed foundry techniques, plus improved cutting tools, ease the job of casting and machining the super-hard material. Cylinder wall surfaces cast in the alloy contain low-wearing silicon crystals, separated by oil-retaining aluminum pockets.

Cut Cost on Turbine Wheels

A new method eliminates close-tolerance broaching of both blade roots and blade-root cavities. Instead, the wheel proper is extruded around the blade roots by a forging process. Wheels up to 30-in. diam can be made with a 30,000-ton forging press.

X-Rays Measure Parts

Wherever mechanical measuring devices cannot be used for dimensions inside metal parts, a new X-ray technique measures such dimensions with precision. A lead sheet masks out all X-rays except for a narrow beam. By sweeping the parts with film mounted beneath, the result is a picture in a 1:1 ratio. Objects less than ½-in. high can be measured to within 0.0005 in., while parts up to 1-in. high can be measured to within 0.001 in.

Millroom in Atlantic Steel's new plant. In the right foreground you see the Cleveland unit which serves as Kick-off Drive on the Shear Discharge Table.

8 CLEVELAND drives equip new DIXISTEEL TRADE MARK bar mill

ONE of the finest, fastest, most versatile of the recent additions to America's steel processing facilities is a new 13" merchant bar and rod mill at Atlanta, Georgia. In operation since last November, this mill produces rods, rounds, flats, angles, channels and light sections of various sizes under the well-known name of Dixisteel, trademark of the Atlantic Steel Company.

Power transmission equipment includes another famous name product—Cleveland Worm Gear Speed Reducers —of which 8 heavy-duty units are employed as drives on the mill discharge table and cooling bed carry-over.

Whenever drives must handle heavy loads under difficult conditions—efficiently, economically, continuously, dependably—industry chooses Clevelands. There are models to meet every requirement, wherever a powerful right-angle drive is preferred. To see the complete line, write for a copy of Bulletin 145—just off press.

The Cleveland Worm and Gear Company, 3282 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers, Limited.

CLEVELAND
Worm Gear
Speed Reducers

Chances Are Slight for a Capital Goods Upturn Before 1960

Major industries are now rounding out their expansion programs. Decline should end early in 1959.

But a general business upturn will have to precede a significant capital goods upturn.

■ "We're bidding on a lot of work, but we're just not getting any."

This observation of one large heavy industry supplier is typical of the capital goods industry today. The demand for new plants and equipment is far from dead, but the current state of business has set capital spending back on its heels.

Down 20 Pct—Industry spending for new plants and equipment will probably continue on the downtrend through 1958 and start 1959 at an annual rate of slightly less than $30 billion. This compares with spending of $36.96 billion in 1957, indicating a drop of about 20 pct.

The decline in capital goods spending was inevitable even without the sharp drop in business. Many of the major industries had planned long-range programs to start tapering off this year. The drop in business with resulting idle capacity only accentuated the decline.

What's Ahead?—After the start of 1959 a sideways motion is indicated, with a gradual upturn indicated in the 1960's. Meanwhile, the rate of around $30 billion is far

But These Intangibles Could Reverse Downtrend

While the capital goods outlook is not at all encouraging, a strong potential exists below the surface.

There are some likely possibilities that could start capital spending on the uptrend. If they occurred in combination, they could generate a moderate capital goods boom. Here are a few of the possibilities:

Crash Program for Small Car—This is only a possibility at the moment, but one with great potential. If one or more of the Big Three launch a rush program for a small car, the entire capital goods outlook might change over night.

This possibility gained strength last week with reports of a GM tooling program for a small engine. Ostensibly, it is aimed for GM's Australian car, but it could be for a domestic small car.

At the moment, neither Ford nor Chevrolet has released tooling orders for a small car but they are asking for tooling quotations. Programs are confined to new engines. If a small car, or cars, materialize, they would be built in existing plants on, as far as possible, existing equipment.

However, this would still involve major expenditures for the new tools and dies, fixtures, and other manufacturing and assembly equipment.

Government Help for the Railroads—Ordering of freight cars has dropped to practically nothing as the hard-hit railroads pull in their equipment horns. But no one doubts the roads' need for new equipment, even with today's depressed railroad business.

Last week the President called for a five-point plan to aid the railroads. It included guaranteeing loans up to $700 million, although the roads would like outright Federal loans.

New Federal aid, making it easier to finance new equipment, plus possible changes in ratemaking policies, could put the roads back into the equipment market.

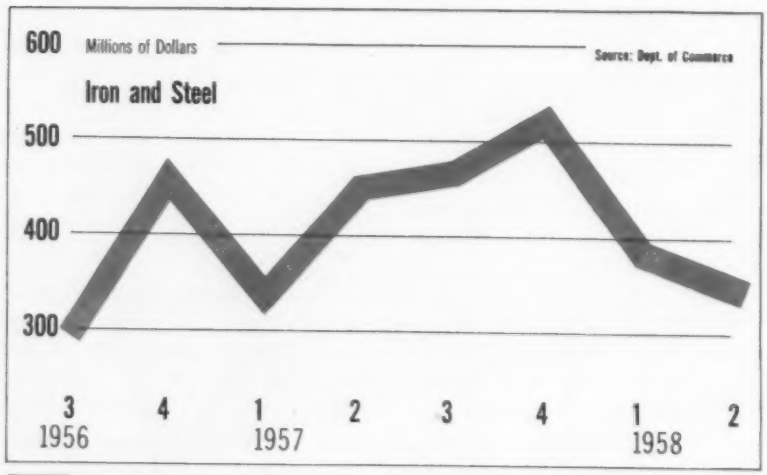
Growth Industries—Some of the growth industries, like petroleum and chemicals, are temporarily discouraged from increasing their capital goods outlays. An upturn of confidence could bring them back into an expansion mood.

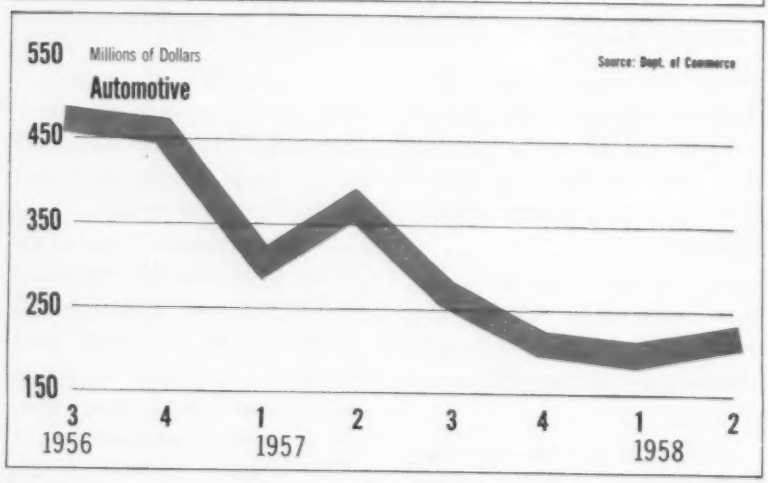
The surplus confronting the petroleum industry, for example, is not considered permanent, although it has had a depressing effect on expansion. The Memphis case created an artificial deterring factor on pipelines as well. A favorable decision would let loose major projects.

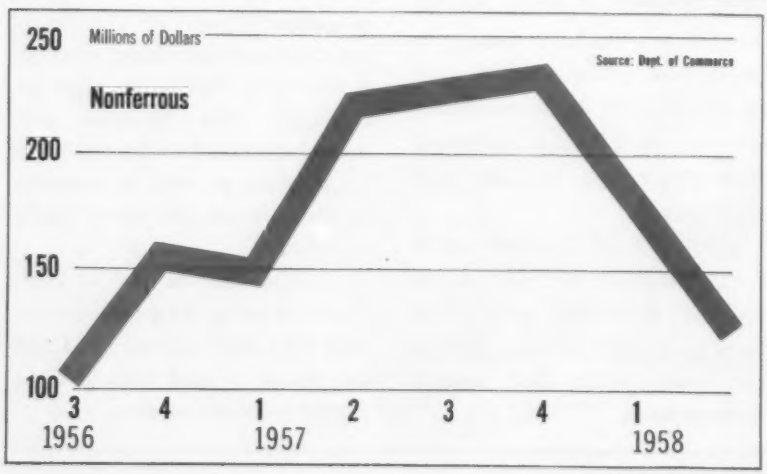
A Good Time to Buy — Companies in strong financial positions with solid cash reserves could find the present a good time to make capital goods investments.

Trouble Spots in Capital Goods Spending

Quarterly Spending for New Plants and Equipment in Millions of Dollars







from disastrous. It is better, for example, than 1955 or 1953, generally considered good years.

While the gradual decline and leveling off appears to be inevitable, there are intangibles at work that could change the picture. (See box.)

The sideways movement forecast for 1959 is not universally accepted. For one thing, long range forecasts tend to reflect the state of mind at the moment. Today, the state of mind is low, with outlooks tending to be pessimistic.

Outlook Can Change—This works both ways. A sharp improvement in buying, particularly of consumer durables, could change the picture over night. But continued apathy for an extended period could force more severe cutbacks.

It's generally conceded that a general business upturn will have to precede any major pickup in capital spending.

Here is the spending outlook for capital goods for specific industries as reported by The IRON AGE editors:

Steel—Steel mills are saying little about capital spending for 1958 and nothing about 1959. A good part of the 1958 spending is a carryover from programs started last year or earlier. A large part of spending will run out the first part of the year.

Reflecting this trend, equipment makers report shrinking backlogs. Blaw-Knox and United Engineering and Foundry have watched their backlogs dwindle, but both expect enough business for a good year.

Automotive—There is a strong possibility of crash programs for small cars in the next year or two, but, unless these materialize, actual spending this year and next appears to be fairly light. Little will be spent during the next few years for plants.

Chrysler should spend a considerable amount for tooling for its 1960 lines, which are reported to be unitized construction. This will involve heavy investment in welding equipment, new fixtures, and conveyors. But no new plants will be needed.

Other auto changes will also use existing facilities, and probably won't call for the layout for equipment that the Chrysler program does. Other changes in the next few years will be styling changes, which will involve extensive tooling costs, but not the new engineering changes that involve really heavy outlays. No new engines appear likely through 1960.

Nonferrous — Expansion programs in the nonferrous industry will taper off the next few years. Alcoa, for example, spent $207.5 million in 1957 on capital equipment, will spend $77 to $93 million in 1958 and an estimated $70 million in 1959. Reynolds spent $115 million for plants and equipment in 1957, will spend about $90 million in 1958.

The major aluminum companies are rounding out their planned expansion programs, and will complete new facilities that were included. Unless demand goes up sharply, facilities will be adequate.

Appliances—The 1956-57 period marked the high point in appliance industry building boom. It is now phasing out in a period when it is operating at an estimated 55 to 60 pct of total capacity, although picking up speed.

Appliance builders have their long range sights set on 1960, believe they have enough capacity until the '60's, when new programs are expected to begin again.

Machine Tools—Many machine tool builders are resigned to operations at current levels for the foreseeable future. Initial shock of the recession is past and they are now going about attempting to adjust by cutting costs, replacing obsolete equipment, and boosting efficiency.

They are working on new cost-saving machine tools, seeking bids, working over new designs. They find that customer boards of directors are vetoing capital expenditures as a matter of course, but hope by midyear there will be a loosening of purse strings.

Better Market Due, Steel Leaders Say

▪ Top steel executives are on the record: There will be a sales improvement by Labor Day or sooner. Steel price increases on July 1 are inevitable.

Speaking at their annual meetings in Pittsburgh, here's how three top steel men feel about:

Markets: Inventory liquidation should end this quarter, says Avery Adams, president and chief executive officer, Jones & Laughlin Steel Corp. After that steel shipments should move upward.

Ten Points a Quarter—"We have seen some signs of modest improvement," Mr. Adams said. "Our new bookings are at the highest rate since November. They have been improving steadily since the middle of March."

He predicts the steel operating rate will move upward like this: second quarter—55 pct, third quarter—65 pct, and fourth quarter—75 pct. An output of 87 million tons for the year as a whole is estimated by Mr. Adams.

Dog Day Delays?—George M. Humphrey, board chairman of National Steel Corp., feels inventory cutting should end about midyear. He speculates, however, that the summer vacation slowdown may delay any real pickup until after Labor Day.

"There is nothing that could throw us into a downward move," said Mr. Humphrey, "unless people get alarmed at the federal deficit and inflation . . . that isn't the prospect."

E. J. Hanley, president, Allegheny Ludlum Steel Corp., reports some improvement in electrical steels and high-temperature metals. But he indicates there's still no evidence of a near-term pickup in overall operations.

Prices: A July 1 wage increase of 20 cents an hour will make a steel price increase justifiable and inevitable, Mr. Adams says. He feels a $10 per ton price increase will be needed to cover added wage costs of $3 to $4 a ton and $6 a ton in added costs of goods and services.

J & L's AVERY ADAMS: A price increase of $10 a ton needed. . . .

Higher Costs, Higher Price—Mr. Humphrey puts it this way: "Earnings statements indicate the steel industry moves together . . . it's perfectly evident that the steel business can't get along with increased costs without increased prices."

"An increase in selling prices is certainly in order," Mr. Hanley said.

(For the comments of David J. McDonald, United Steelworker president, see page 44.)

Earnings: All three companies reported sharp drops in earnings. However, despite this they operated at a profit in the first quarter.

OPPONENTS: Counsel in Bethlehem - Youngstown merger case meet outside courtroom. Left to right: Whitney North Seymour, counsel for Youngstown Sheet and Tube; Bruce Bromley, representing Bethlehem; and Allan A. Dobey, who heads the Justice Dept.'s staff. Case will conclude this week or next.

Merger Heads for Supreme Court

Bethlehem - Youngstown trial is only the preliminary. Both sides have indicated they will appeal an adverse decision.

Case actually is wrapped up in stipulations. Capacity costs argued.—By G. G. Carr.

▪ In a drab courtroom in the United States Court House in New York the most important anti-trust case of the decade is unfolding.

The Bethlehem-Youngstown merger case, tried in room 1506 before Judge Edward Weinfeld, will be a legal milestone in the history of anti-trust litigation.

To Supreme Court—In addition to deciding the issue, whether Youngstown Sheet & Tube can be merged into Bethlehem Steel Co., the ultimate decision will spell out the law on the vital issue of competition. It will have a profound impact on the face of American industry for years to come.

Ultimately, the U. S. Supreme Court will make the final decision, and will, in effect, write the anti-trust law. Congress, in writing the law, produced little but vague and ambiguous clauses which will have to be interpreted by the Supreme Court.

Preliminaries — The actual trial will prove nothing and has the overall effect of a practice session. At great cost to the taxpayers, and to the companies, it will produce only:

A. Basis of an appeal to the Supreme Court by the loser;

B. A sure place in future legal texts for Judge Weinfeld;

C. A political credit for the government's anti-trusters.

Each side admits it will appeal an adverse decision. But despite the low-key mood of the day-to-day trial proceedings, both the government and steel companies are battling grimly for a favorable verdict.

In Stipulations—Judge Weinfeld is considered one of the keenest minds and hardest workers on the bench, with a prodigious memory. His findings are sure to carry great weight with the high court. From the Supreme Court's decision there will be no appeal.

Actually, the bulk of the case was wrapped up before the trial ever started. Most of the facts are contained in the voluminous "stipulations," statements to which the opposing attorneys agree—or to which they have no objections.

So vital are these stipulations that government attorneys once considered resting the government's case solely on these documents, with no trial hearing.

Companies' Side — The stipulations provide the factual basis on which rest the opposing arguments of the government and Bethlehem-Youngstown. They include pages of definitions, statistics on capacity, products, sales, and the like. On these facts the steel companies rest their arguments that:

1. The merger would increase, not diminish competition, particularly in the Midwest;

2. There is now relatively little competition between Bethlehem and Youngstown;

3. Bethlehem's comparative national size is over-emphasized. Steel is not a national market, but several local markets served by regional plants.

4. The merger would bring savings by eliminating cross-hauling and duplication of equipment.

Government's Case — To these arguments, the Justice Dept. replies:

1. The merger may substantially lessen competition or tend to create a monopoly;

2. Competition between Bethlehem and Youngstown would be eliminated or substantially lessened;

3. Concentration of equipment for production of iron, steel and oil well drilling and production machinery in hands of largest producers would be increased;

4. The merger would heighten Bethlehem's competitive advantage over smaller companies.

Pro and Con — Privately, most steel executives are concerned over heightened competition in major markets and products if the two companies are allowed to merge.

On the other hand, approval of the merger would clear the way for other producers to do the same. It is known that some companies are holding up merger talks until a final ruling in the Bethlehem-Youngstown case.

Defense lawyers are expected to close their case this week or next. Then will come arguments on their motion to dismiss the suit on the grounds that the government has not proved this case.

Decision by Judge Weinfeld is looked for somewhere between June and September. Thereafter, the loser will have 60 days to file an appeal, a foregone conclusion.

Many Carbide Users Buy Blindly

Surprising laxity in methods for specifying carbide tools is uncovered.

A reappraisal could do a lot to step up machining efficiency in fabricating plants.

▪ Too many metalworking companies are failing to get the most out of their operations because of obsolete machine tools and confusion in specifying carbide cutting tools, a survey reveals.

Nearly half the machine tools in use today are unsuited for carbide, according to the survey conducted by an independent research group for Wesson Co., a Detroit carbide and tool producer.

Not all machines suited are actually equipped with carbide. In fact, in the metal products industry, only about 33 pct are actually equipped with carbide cutting tools.

How They Order—A big question the survey tried to determine is how industry goes about ordering its cutting tools. Researchers studied data to uncover reasons for apparent slowness of some segments of industry in using carbides.

It was learned that specification methods vary widely. Few companies have their own "grade designations." Instead, most use one of four methods, but apparently without understanding why.

Purchasing's Choice—The most popular method is specifying carbides by "one make or grade or equivalent." This method is used by 60 pct of the companies surveyed. In practice, the tool designer or process man need know only one grade of carbide that will do the job.

Final responsibility for obtaining that grade rests with purchasing. Selection is based on price and delivery. When purchasing can show savings over a specified carbide and can arrange uninterrupted delivery, then they can make substitutions they consider equivalent. Most purchasing departments, the survey points out, are in no position to make such technical decisions.

The Chart Method—In a second method, many companies use a grade number from the Manufacturers Interchangeable Grade Designation Chart as their primary specification. Carbide purchases based on this type of information may or may not do the job desired, the study cautions.

A third method specifies "one make and grade with no substitute." It's obvious that few large firms use this method, the study indicates, because larger companies will seldom restrict themselves to one source.

Recommended—The fourth, and probably the best method for ordering, is by specifying "two (or more) specific makes and grades with no substitutes." The advantages attributed to this method are: surest way to get best grade, tieing down of quality required, offers leeway on price but avoids "lowest price" as the only criterion of selection. This method is used by 23 pct of the companies surveyed.

But for this method to succeed, Wesson advises, carbide specifiers must be well informed about carbides. Where an adequate test program is in use, this method seems to lead to best results in overall economy and production results.

The survey shows, Wesson claims, that firms who order by the specific method are better satisfied.

Alcoa Bids for Packaging Sales

Unveils New Research Facilities, New Projects

Division status for foil and packaging researchers is an indication of Alcoa's appraisal of the market potential.

Biggest U. S. producer coming into the "can" field with a foil and fibreboard model.

▪ Aluminum Co. of America unveiled its new foil and packaging research facilities at New Kensington, Pa., last week.

The company spiced up the event by revealing some of its more original projects, and some tough talk on its aims in this highly competitive market.

New Arm—The new division is actually an arm of Alcoa Research Laboratories. A formal program on foil and packaging was launched about two years ago. It sprouted, until last October when it was assigned division status, under Dr. Mike A. Miller.

Extensive equipment, manned by 19 researchers, includes walk-in cabinets for controlling temperature and humidity, devices for filling and sealing containers, apparatus for sealing aluminum cans, laminators, cutters, slitters and printing presses.

Behind Alcoa's intense interest in foil packaging: Consumers spend about $15 billion annually on packages. The aluminum industry has invested about $30 million on foil production equipment to tap this market. The outlook is considered excellent. But they have rolling time on their hands on new capacity.

Sales Moving Ahead — Aluminum foil's penetration into packaging shows no sign of easing. Foil sales resisted the general downward trend last year. And this year they are expected to run ahead of 1957.

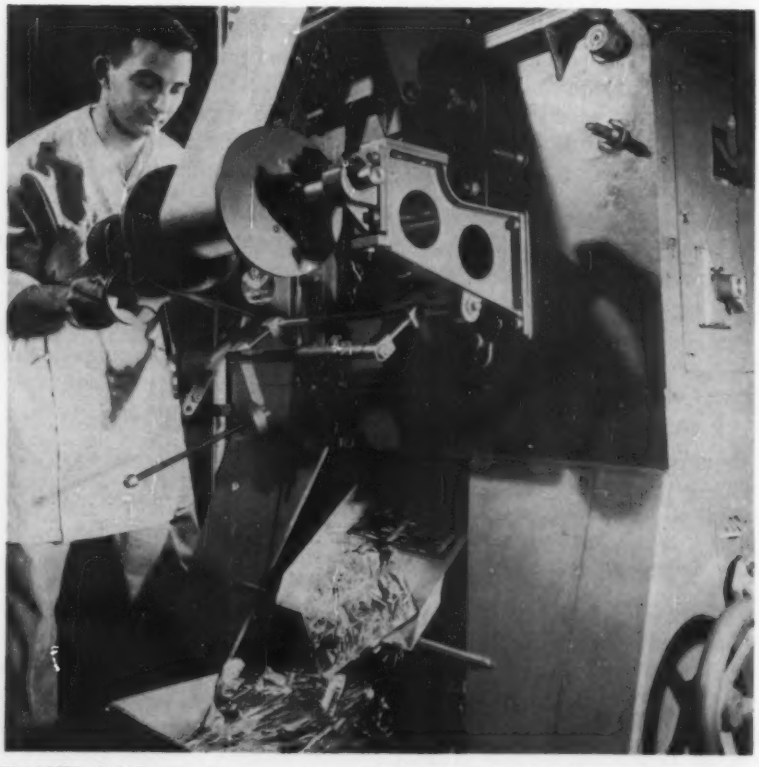
Major new developments announced by Alcoa include: A method of adhesive application that gives hermetic sealing of foil overwraps, a new portable cooler made of laminated foil, and a method to apply a new plastic (Goodyear's Videne A) to foil.

Research for Sales — As these uses suggest, packaging research at Alcoa is along product lines largely as a service to and for converters. The company works out many ideas, but goes to commercial production itself in only isolated cases.

For example, the foil-lined cooler is a product of Stone Container Corp., Philadelphia. Alcoa provided the temperature tests to establish the soundness of the theory and planning. In the new sealing method for foil overwraps, Alcoa perfected a process developed by Pacon Research and Development Corp., New York.

Alcoa's Can—One of the most intriguing of Alcoa's current projects is an oil can. Unlike the other major producers probing the possibilities for an aluminum can, this candidate is fiberboard and foil. According to Alcoa, everyone who has been in contact with this development is enthusiastic.

Alcoa officials are quick to point out that this does not mean the company is overlooking more conventional approaches to the aluminum can market. They say they are ready to move into the picture if and when conventional cans become a real market for aluminum sheet.



IN THE BAG: The Bell pouch machine is constantly in use at Alcoa Research Laboratories Foil and Packaging Div., turning out foil laminated bags and pouches for exhaustive testing of this packaging method.

Metal Powder Industry Forms New Federation

The metal powder industry unveiled its "new look" at the group's annual meeting in Philadelphia last week.

Created was a new trade organization, the Metal Powder Industries Federation. The MPI is actually an overall industry group including within it four trade associations, plus a technical institute.

Streamlining the Aim — The move is designed to weld together for more effective cooperation diverse industry groups with common interests. The individual associations are: the Metal Powder Producers Assn., Ferrite Manufacturers Assn., Metal Powder Core Assn. and Powder Metallurgy Equipment Manufacturers Assn.

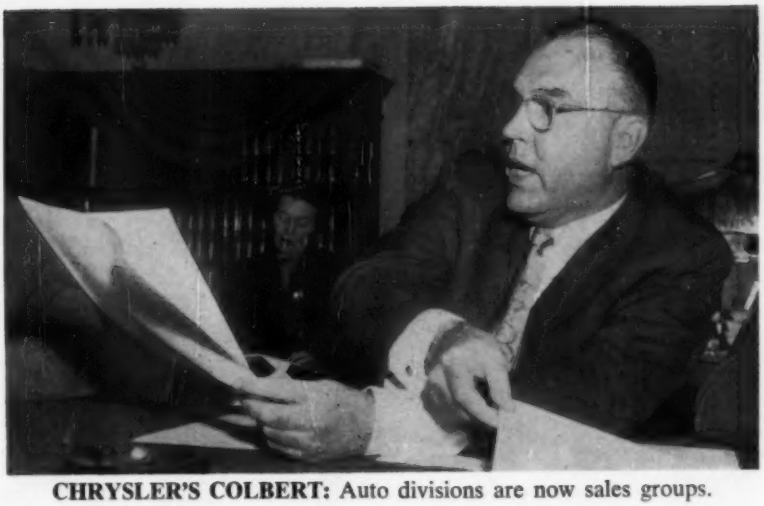
A technology division will function through the new American Powder Metallurgy Institute, whose main interests will be technical development and market research.

Separate, Yet Together — The MPI will allow each industry group to concentrate on the problems most important to it.

Elected as first president of the federation was Dr. George A. Roberts, Vice President of Vanadium-Alloys Steel Co. He has just completed a term as president of the Metal Powder Assn., now succeeded by the MPI.

Named executive secretary of the federation was Kempton H. Roll, previously executive secretary-treasurer of the Metal Powder Assn.

Elected presidents of the various groups in the MPI are the following: Metal Powder Producers Assn. —Ernest H. Klein, New Jersey Zinc Co.; Metal Powder Core Assn.— D. L. Almquist, Stackpole Carbon Co.; Ferrite Manufacturers Assn.— Christopher L. Snyder; Powder Metallurgy Equipment Mfgrs. Assn. —Byron Belden, Baldwin-Lima-Hamilton Co. R. C. Burgess, Burgess-Norton Mfg. Co., will serve as chairman of the American Powder Metallurgy Institute.



CHRYSLER'S COLBERT: Auto divisions are now sales groups.

Chrysler Reorganizes

▪ Chrysler Corp., as part of a reorganizational swing back to centralized control, has converted its auto divisions into nothing more than sales groups.

The move—scrapping a decentralization program that began in 1954—places autonomy in three functional groups at the executive level.

One will be responsible for all automotive sales and marketing activities under a newly-created office of group vice president-automotive sales. Each of the Chrysler car divisions will be headed by a corporate vice president and general manager reporting to this office. Formerly division heads held the title of president of the division.

Functions Grouped — A second new group will consolidate all basic manufacturing and assembly operations under an office of vice-president-automotive manufacturing.

A third group will combine executive staff functions relating to product planning, programming, and manufacturing under an office of vice president - corporate planning staff.

Under the new setup, auto division heads will no longer be responsible for manufacturing as well as marketing their lines. The automotive manufacturing group will assume production and assembly functions.

Operations Combined—It's possible the new program may lead to a continued integration of Chrysler's manufacturing activities. These already include combination of Chrysler and De Soto production on the same line and centralizing of engine manufacturing in two plants.

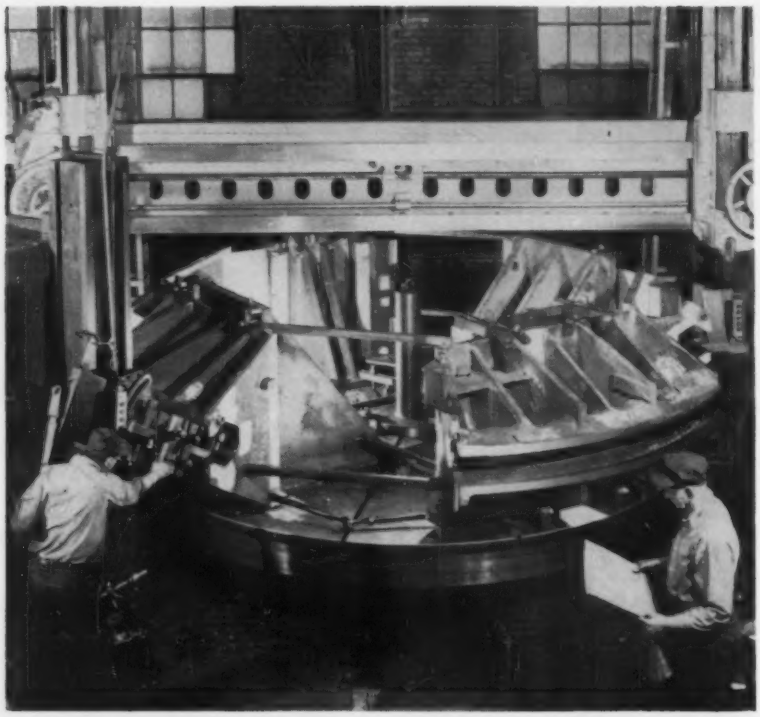
In the reorganization nearly every key automotive sales manufacturing and planning executive at Chrysler has a new title and responsibilities.

Reasons Why—Why such a drastic shakeup at this time? It's related to the company's poor sales showing this year. But this is only a partial reason.

Chrysler just isn't large enough to afford the luxury of decentralized divisions with the added burden of duplication of engineering, manufacturing, and planning staffs.

Another consideration is Plymouth. Under the old setup where each division was dueling with the others to show a profit, Plymouth was at a disadvantage. Other Chrysler divisions pressed car dealers to promote the higher priced lines for better profits. The new shift may ease some of this pressure on Plymouth.

Saddles Over the St. Lawrence Seaway



SADDLEMAKER: Suspension cables on the St. Lawrence Seaway bridge at Rooseveltown, N. Y., will ride on four cast steel tower saddles. The castings are being machined at the Wheeling, W. Va., plant of Blaw Knox Co. The grooves in each 7455-lb saddle must be machined at an angle slightly off center to fit the cable contours.

Plant Location Key

What is the final step in selecting the location for a new plant? H. Campbell Stuckeman, vice president, Rockwell Manufacturing Co., who has supervised establishment of a half-dozen new plants in the past few years says, "Our final decision on a location is made by an unscientific walk around town."

What does Mr. Stuckeman look for? He says he looks to see if the grass is cut, and the shape of schools, homes and churches.

McDonald Blasts Wage Hike Critics

United Steelworker president, David J. McDonald has blasted suggestions that his union forego the wage increase due July 1. He said he had received "feelers" from steel executives along these lines.

Mr. McDonald referred to the union's belief that "A contract was a sacred thing." "We have not changed that belief," he insisted, "nor do we ever intend to change it."

Forecasts Price Hike—He said U. S. Steel was not among the companies that had approached him, but he lashed out at Roger Blough for speeches blaming price increases on the union. "It's all very simple." He said. "Mr. Blough is again laying the groundwork for another increase, along about July, in the price of steel."

He called on the Dept. of Justice and the Federal Trade Commission to launch a study of steel pricing to determine possible violations of the anti-trust laws.

Mr. McDonald's remarks were made at a union district conference.

No New Depreciation Code Yet

Revision of the Internal Revenue Service tables of useful lives of productive equipment (Bulletin F), won't be finished for "some time."

The revision was started almost a year ago. At one time IRS officials hoped to have it ready by March or April. Now spokesmen say it will be another month or so, maybe longer.

Machine Tool Comment—A. V. Bodine, president, National Machine Tool Builders Assn., in a letter to Secretary of the Treasury Anderson, said, this revision is "the most important anti-recession measure the Treasury could adopt."

The current capital goods decline, asserts Bodine, is in large part the result of restrictive depreciation policies that discourage investment in capital assets.

Waits Approval—The actual revision of the Bulletin was prepared by a special government-industry committee and went to top government brass some time ago. As yet, it hasn't been approved.

Business Is Coasting

Business is coasting, seeking the critical turning point, says the business survey committee of the National Assn. of Purchasing Agents.

The new order situation is called "one of the bright spots" by the group. Their poll reveals 27 pct of replying companies are in a better position than last month, 44 pct report no change, while 29 pct signified a decrease.

Production has stayed about the same, say 54 pct of the replies. Only 16 pct report any increase, while the remainder are still heading down.

"Buyers are still reluctant about making forward commitments," says the survey committee. "With nothing in short supply they will continue to play it close to the vest."

NEWS ITEM No. 5

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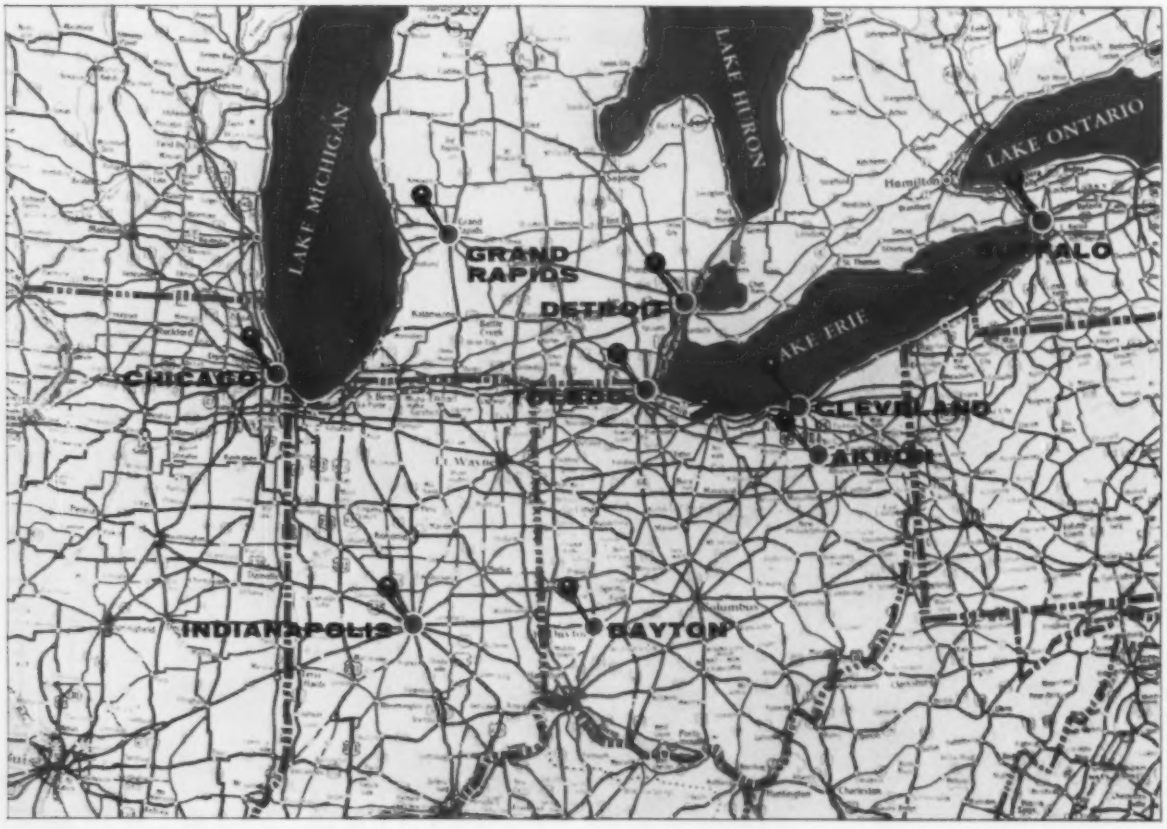

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Ralph C. Moffitt

His Purchasing Earns Profits

At 38, Mr. Moffitt is recognized as one of the top purchasing men in the country.

Here's how he manages U. S. Steel Corp.'s giant buying organization.

RALPH C. MOFFITT: Purchasing is more than a spending function.

▪ How do you control a purchasing operation that pays out over a billion dollars a year, deals with more than 50,000 suppliers, and buys that number of individual commodities?

You don't do it by laying down a lot of ironclad rules, says Ralph C. Moffitt, vice president, purchases, U. S. Steel Corp. The answer is in a flexible organization where functions are centralized or decentralized according to particular conditions.

No Fixed Pattern—For instance, the central purchasing group at U. S. Steel's Pittsburgh headquarters does most of the buying for plants in the eastern area, including Chicago. It buys common items for National Tube Div. and American Bridge Div.

On the other hand, it leaves most of the buying for western plants to local offices. American Steel & Wire Div. in Cleveland does its own purchasing. The central group buys tin for the whole corporation. But most lumber is bought locally.

Building Respect—In its relations with other departments, Mr. Moffitt sees no need for purchasing to build a fence around its prerogatives. "We don't have the philosophy that you need a pass from purchasing to get into a plant. If purchasing earns the respect of other departments, prerogatives will take care of themselves."

Mr. Moffitt played a key part in building up this respect. From 1950-52, when U. S. Steel was integrated into its present form, he was part of a three-man team that visited outside plants in search of new purchasing ideas.

Buying for Profit—Out of this and other studies came several purchasing concepts. The most basic of these is the notion that purchasing is a profit-making function.

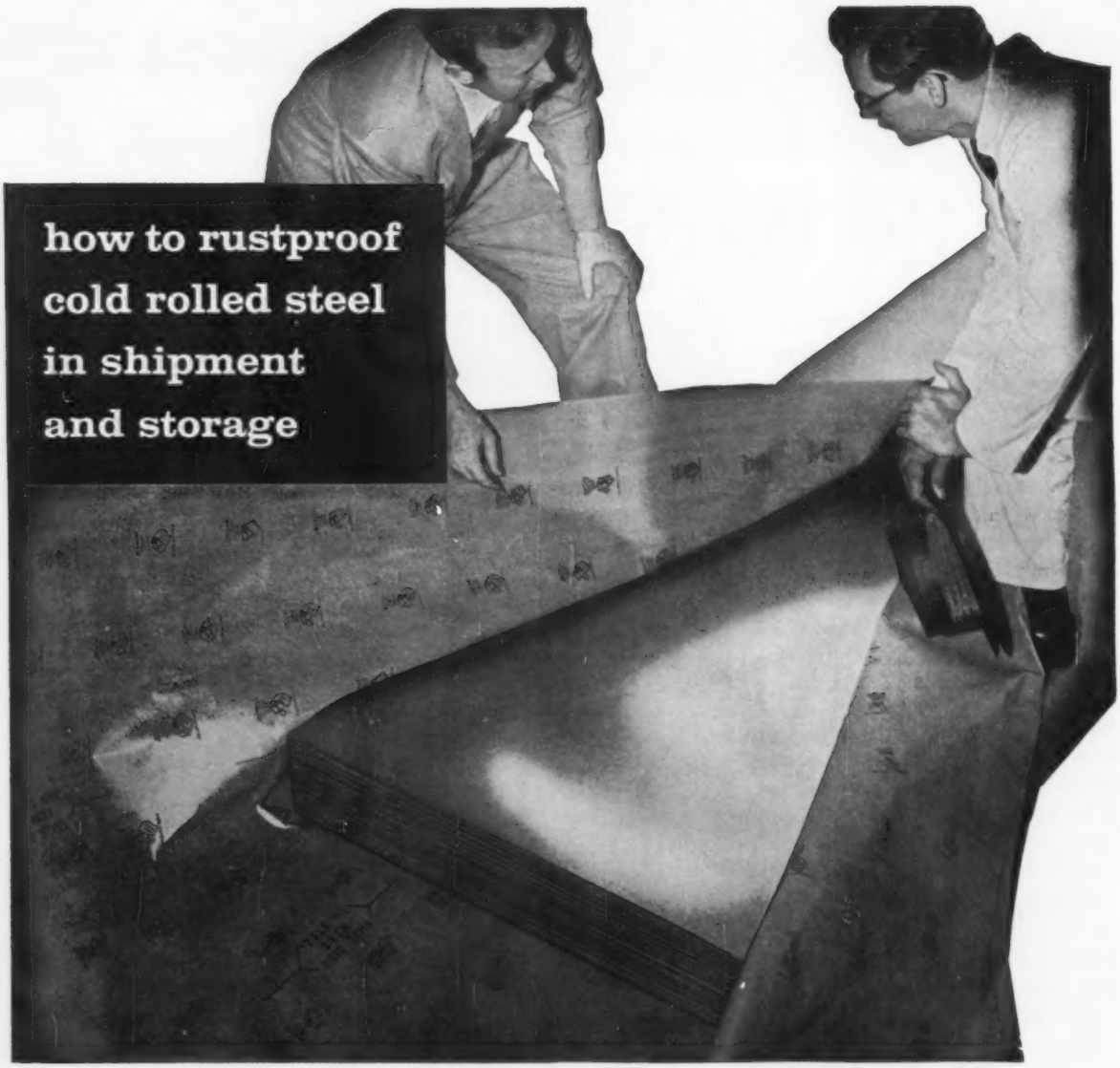
"Savings through efficient purchasing find their way into a company's profits as rapidly as increased revenue from operating or sales efforts," says Mr. Moffitt.

Research At Work—Backing up this thinking, the corporation originated the idea of purchasing research. A department was set up to study and improve all purchasing functions.

"A line buyer just does not have the time or training for this kind of research," Mr. Moffitt explains. "You need a staff or service group."

Development of people is another cornerstone in U. S. Steel's purchasing operation. This involves training both inside the company and at outside schools. The Corporation expects more than just order placing from its buyers.

"You give your people all the help you can," says Mr. Moffitt. "If a man still can't do the job, then you have a personnel problem."



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Income: Not so High as It Looks

Personal income has stayed relatively high, but the total is misleading.

Increased unemployment payments, high dividends, make the picture look better than it really is. Then there's higher prices.

■ In spite of the discouraging sag in business over the last six months, personal income has remained surprisingly high.

Income of individuals is down far less than the overall national income and has stayed much higher, proportionately, than national production.

Dept. of Commerce figures show that personal income has dropped about $6 billion, in annual rates, from the point six months ago. That's only about a 1.5 pct drop in the period that covers most of the business decline.

Serious Gaps — At first glance, that's a pretty good record. And it accounts for the relatively high level of consumer spending. But a closer look at income figures shows some serious gaps, and results in some ominous overtones.

Actually, wages dropped off a full $8 billion with other sources of income off another $1 billion. But government payments to individuals immediately jumped $3 billion, in unemployment benefits.

Dividends Stay Up — Another factor holding up personal income is that dividends have stayed relatively high, at least up to now. This reflects the traditional lag of dividend policy behind a business downturn. However, with many businesses suffering first quarter losses, future payments are somewhat jeopardized. At least, the feeling of uncertainty over dividend income is likely to be there.

It's obvious that personal income, while comfortingly high overall, is less robust than first glance would indicate. And the buying power generated is likely to drop to an extent out of proportion with actual dollar loss.

Aggravating the situation is an additional drop in real income, caused by higher prices. Actual decline is 3 pct in real income.

Uncertainty Hurts Durable Goods

This uncertainty behind personal income has contributed a great deal to the decline in buying of consumer durables.

It's been pointed out that purchases of durables are easily deferred, particularly when the purchase is to replace a slightly outdated product, but one that's giving service. At the same time, there are many demands on the average paycheck that cannot be deferred.

Durables Lag Behind—That's a big reason why production of durables is off to an extent not indicated by the rate of income. Passenger cars are down 30 pct in the first quarter of this year compared with the same period of 1957; TV sets are down 17 pct; radios down 30 pct; refrigerators down 29 pct; washers down 20 pct.

The tendency to postpone major purchases is evident here.

In contrast, men's suits are down 19 pct, women's dresses down six pct, cigarets up a fraction; motor fuel down four pct. These tend to reflect economies, but not the long deferments of durables.

Steel Hit Hardest—This would also indicate that modern living has made a TV set less deferrable.

Continuing with the chain reaction, steel production is off 40 pct in the same period. Comparing this with the less significant decline in products made of steel gives an idea of the extent to which steel users have been living off inventories.

Small Business: Is Help Finally Coming?

The so-called plight of small business, a hot subject a year ago, virtually lost itself in the recession plight of all business.

But the long delayed tax relief program for small business may get off the ground soon. The House Ways and Means Committee will start looking over a program in a week or two.

Wide Support — Although small business aid bills receive wide support, they somehow die of lack of interest. And it could happen again if this program gets snarled in tax hassles.

The Administration's four-point program would extend accelerated depreciation to used machinery; allow some small corporations to be taxed as partnerships; permit some small firms to pay estate taxes over a 10-year period; and permit investors in small firms a greater tax reduction for losses.

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WATCH SPECS: Continuing review of part specifications can unearth new ways to cut materials costs.

How To Lower Materials Costs

Check Nonmanufacturing Functions

By Charles P. Hawkins, Vice President, Trundle Consultants, Inc., Cleveland

Nonmanufacturing activities are a prime area to search for lower materials costs.

Savings are possible by close scrutiny of design, methods and purchasing.

▪ A manufacturer of electric motors for home appliances was losing money because it couldn't sell one of its products competitively to a large direct mail order house.

For one thing the motor weighed 40 pct more than competing units. Also, it had been engineered to stand up under use 24 hours a day, seven days a week. By contrast, rival motors were designed to work only a few hours at a time—and were proving sufficiently rugged for the work required.

The solution: The company redesigned the motor at a 40 pct saving in materials costs—and successfully regained its share of the business.

Make Close Study — Materials costs in the metalworking industry range anywhere from 30 to 70 pct of total production cost. But, as in this case, sizable savings are possible through closer attention to those nonmanufacturing activities which bear directly on materials costs. These nonmanufacturing areas include: 1. Materials specifications; 2. Methods and standards; and 3. Purchasing practices.

A planned, orderly approach offers the most assurance for lowering materials costs through nonmanufacturing activities.

Like this motor manufacturer, one of the first things you can do is compare your products with those of your competitors. By checking every part against similar parts in competitive products, the cost-conscious company can discover whether rivals are using less expensive

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This is the first of a number of articles on the various approaches management can take to lowering costs.

Later subjects to be covered by Trundle Consultants include quality control, manufacturing methods and material handling.

parts to do the same job. Also, they can learn whether components of competitors' products give higher performance at no extra cost.

Design Savings — By studying product design, it is often possible to come up with materials savings. Many companies, for example, specify finished castings for parts where the finish is not important. Some firms have saved up to 20 pct of their materials costs by dropping these operations.

Companies should check on the tendency to overengineer products. Many will find it more advantageous to have a half of one percent return or replacement of a product rather than pay a 10 pct greater materials cost because of overdesign.

Another technique for cutting costs is to consider alternate production processes. A part specified as a casting might also be made as a weldment, or stamping, or even machined from bar stock, at a lower cost, without sacrificing utility or quality. This type of cost-cutting has been widely used in case of

Redesign For Competitive Market

▪ The Oster Mfg. Co., a leading producer of power-driven threading equipment, offers a good example of what can be done to lower materials costs through manufacturing functions. By applying the methods suggested in this article it was able to shave 30 pct off the retail cost of one of its products.

About a year ago, the company decided that the price of its power-driven pipe machine was beyond the reach of many small plumbing contractors. It felt that it could broaden its market for this product if it could produce a unit to sell under $200.

Oster took a long, hard look at its machine and compared it with competitive products. It decided that nothing less than a total redesign would do.

Three-Way Attack—Its attack on the problem combined advance designing, use of the best and lowest cost materials for each component, and a program of make or buy.

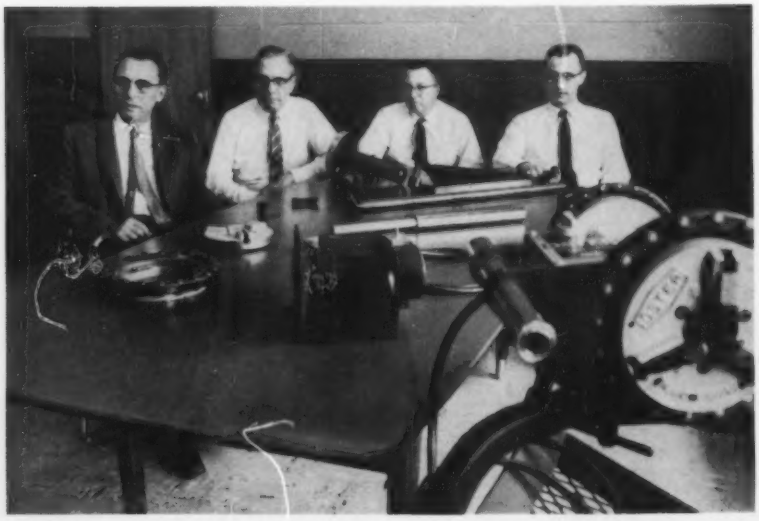
The motor of the power drive was a geared-head unit whose exposed gears had required that a separate casing be put over it. In redesigning the product, Oster converted the motor unit into a driving head, placing the basic parts under one cover so that the motor unit itself became the casing. Elimination of the casing resulted in a big reduction in cost.

The company converted the driving arms and driving-head spindle from seamless to butt-welded tubing, cold drawn over a mandrel to eliminate operations and reduce costs further.

Materials Changes—It also made important materials substitutions. The chuck adjustment wheels were changed from aluminum to rubber covered cast iron assemblies to reduce weight and cost. Oster also redesigned the tripod leg assembly using structural tubing in place of heavy-walled pipe. It also decided to save money by buying them formed and punched.

Oster's study of size specifications, engineering standards, and tools and fixtures, produced other cost savings. The tool tray, formerly made of 11-gage steel, was overengineered. It was redesigned as a stamping so that a lighter 16-gage steel could be used. The tray underwent another change. Oster substituted a slip rubber sleeve for the former dip and cure process on the tray hooks.

All in all, the changes Oster effected in its product resulted in cost reductions which enabled the company to market the unit for $199.50, as against $285 price of a comparable unit.



NEW PRODUCT TEAM: Many decisions entered into redesign of new pipe machine. The men who made them are, l. to r., Oster president T. S. Bonnema; advertising manager, L. S. Newman; purchasing agent, L. D. Chernus and chief engineer, R. J. Martin.

stove and furnace products and appliances.

Reduce Parts — Often features can be added to a product which will eliminate the purchase of parts. For example, machine tool manufacturers who used to buy completed pumps as components for the machine tools they were making, now machine cavities into the tool which serve as a pump housing. Then they buy pump sets which they insert into the cavities.

This method saves a very substantial percent of the total cost of the pumps in the machine tool. The instrument clusters in automobiles, replacing the dash panel, also illustrate what can be done to cut materials costs. Formerly composed of many different fabricated parts, they now are produced in one die casting.

In the same product design area, materials substitution and parts standardization offer similar opportunities for materials savings.

Check Methods — Methods and standards experts should reexamine the sequence of operation for routing parts. In many cases, a company can cut materials cost appreciably by having tools and fixtures that center materials more efficiently.

Purchasings Tips—For maximum economy too many companies use oversized stock. This often happens when a company has a small run for a component and feels that having too large a dimension is only a small extravagance. If sales increase, however, what seemed at the outset like a small extravagance becomes a major one.

Investigate the dimensions of your raw materials. Is your company ordering ⅝-in. diam stock when 9/16 in. will do? Is it buying 3⅜ in. instead of 3¼-in. strip? This makes a lot of difference in the ultimate materials cost.

The basic principle to follow regarding size specifications is: Use the smallest size material consistent with good quality as long as it doesn't increase scrap.

Supply Sources—Some suppliers can do a job cheaper and better than others. Some are equipped to work with a wider range of materials than others. Some excel in providing a very specialized item. Purchasing agents can help cut materials costs effectively by "shopping around" to obtain the best source of supply.

The purchase of materials in economical lot quantities is another very effective way of reducing your costs. The purchasing department is familiar with the discount schedules provided by vendors. Simple formulae are available, too, for computing the lowest total purchasing cost.

Purchasing departments should be encouraged to develop new ideas in such areas as maintenance, direct material supplies and equipment.

Make Or Buy Policies—Make or buy decisions are vital to any intelligent appraisal of your materials costs. They call for a flexible approach and a sense of perspective.

You should check and recheck to see if make or buy conditions have changed, since you last analyzed them, and whether components or products you are now making could be purchased more economically on the outside, or vice-versa.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., The IRON AGE, Chestnut & 56th St., Philadelphia 39, Pa.

Checklist for Make or Buy Decisions

The pattern of make or buy decisions may vary within industry. Here is a brief checklist of points to consider:

1. Initial costs—research, engineering, tooling, etc.
2. Previous experience with like items.
3. Cost to manufacture—(including fixed costs)—vs. cost to purchase.
4. Available capacity, finance, materials and personnel.
5. Future requirements.
6. Requirements for additional facilities.
7. Required delivery.
8. Availability of new process restricted to one vendor.
9. Possible suitable and logical vendors.
10. Affect of the increased volume on the pricing formula of a proposed vendor.
11. Possible production interruptions on a single source item.
12. Market conditions.
13. Advantages of both making and buying a portion of the requirements, assuring competitive pricing, qualified engineering and technical assistance, obtaining desirable patent licenses, and protecting supply.

MAKE OR BUY? Checking cost of tubular part are Oster Mfg. Co.'s purchasing agent L. D. Chernus and author C. P. Hawkins.

Why Industry Is Shunning Atoms

Practical Uses for Isotopes Are Slow Coming

Progress is being made, but there is still a lot to be learned about isotopes.

Production men are naturally wary of accepting an unknown quantity.—By H. R. Neal.

▪ What has happened to the atom boom in the manufacturing industry? In the past several years there has been much talk about billions of dollars of savings for industry through the use of radioisotopes. Actual applications lag behind predictions. Does this mean manufacturing industries are sloughing a chance to save money by employing new techniques?

That isn't necessarily the case. The wonder cure of isotopes may have been oversold; but progress and benefit are inevitable.

Expert Opinion—Some research specialists believe the manufacturing industry's nuclear progress is necessarily slow. One of these is Farno L. Green of General Motors Research Staff's Physics & Instrumentation Dept. He has been senior research physicist in the Isotope Laboratory at GM's Tech Center since 1956. Before that he was an Oak Ridge National Laboratory physicist, specializing in cyclotron design, theory and utilization.

Having once been guilty of the practice, he now warns against overselling isotopes as "miraculous production or processing tools." In moving from one job to another, he admits some of his early ideas have been tempered by the practical problems of production.

The Obstacles—For one thing, he says industry is only beginning to collect its nuclear apparatus and skills. However, he believes engineers will have a handbook for industrial uses of radioisotopes—"but not before much basic research is logged in laboratories and many applications are demonstrated successfully in manufacturing plants."

Mr. Green says there are several reasons why industry's nuclear progress is necessarily slow. Techniques are still crude. Supplies of a variety of isotopes are not abundant and nuclear data are still new and comparatively unreliable.

Misinformation is another problem, with progress hampered by the false notion among some people that radioisotopes can't be handled safely.

Knowledge Needed—But safety does require trained specialists, and they are scarce. Mr. Green suggests young engineers now in school consider nuclear knowledge a vital part of their education. By boosting the number of "conventional engineers" with some nuclear know-how, specialists would be free to concentrate on basic scientific work in the atomic field.

This is an approach followed by GM Research Staff and GM Institute to fill the void of engineers with nuclear knowledge. They have set up a 10-week intensive training course for men in various GM divisions.

To Gain Acceptance—Mr. Green says the problems of putting nuclear techniques in industrial pro-

PIONEERING: Here is one of the first industrial applications of atomic energy—use of radioactive isotopes to detect flaws in a heavy casting at Aircraft Engine Div., Ford Motor Co. Much remains to be learned.

A MOMENT WITH MANAGEMENT...

INCREASED PRODUCTIVITY

means HIGHER PROFITS!

Cutting production costs adds directly to profit percentage. It eliminates production losses. Whether they be man-hours, machine time or material, you increase your profit spread.

A new tool is proving its ability to do just that! Many plants (large and small) have found that a total investment of a few hundred dollars actually saves them thousands monthly!

Testing is the new tool that offers immediate and future savings. It spots defects at the earliest possible moment, before a lot of money is spent working on material which can only end up in the scrap-pile.

HIGHER PROFIT PERCENTAGE will result because the returns will be increased from your present man-hours and plant investment.

THE SALES MANAGER will benefit from consistent reliable quality—increased customer satisfaction—reduced or stabilized costs—increased competitive ability.

THE PRODUCTION MANAGER will be able to maintain established quality levels (or meet new higher standards)—eliminate intermittent excessive scrapping of finished parts and often even reduce normal parts scrappage.

Can you afford to overlook these benefits? Write today for a free copy of "Lower Manufacturing Costs," an informative booklet. Or, ask our Field Engineer to discuss where and how low-cost Magnaflux Test Systems have helped others increase plant productivity.

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- ELPAR electric trucks last at least twice as long as gas trucks operating under comparable conditions. Thus, when *all* initial and replacement costs are added up, ELPAR trucks actually *cost less to buy.*
- ELPAR truck operating and maintenance costs are only one-third those of comparable gas models. Based on 2,000 hours of operation, this means an average saving in direct operating costs of over *$1,200 per truck per year.*

These facts are based upon actual case studies from a number of plants. They explain why 75 of the 100 largest U. S. corporations now are using ELPAR trucks . . . and why more and more companies are converting their fleets to ELPAR electrics.

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Automotive Production

WEEK ENDING	CARS	TRUCKS
April 26, 1958*	59,517	16,224
April 19, 1958	73,219	16,655
April 27, 1957	123,633	24,625
April 20, 1957	118,327	23,366
TO DATE 1958	1,508,099	291,757
TO DATE 1957	2,288,981	373,968

*Preliminary Source: Ward's Reports

duction and processing are comparable to those once involved in putting X-ray, spectroscopy, special electronic gadgets and other quality control techniques on the production line.

"First," he says, "they had to prove themselves in the laboratory. Then they moved into the production cycle, but not without some doubt and skepticism as to their reliability and usefulness. . . .

"Admittedly, possibilities for new nuclear techniques in production are vast. But phasing them into the production and processing area takes time and study, basic research and experimentation."

Resistance to Change — Then, too, laboratory conditions and actual plant conditions are worlds apart. In the plant, temperatures may vary by 40° to 50° over a day; there can be dust and corrosive materials in the atmosphere; and machines set up vibrations. None of these conditions normally exist in the laboratory.

Mr. Green pointed out plant managers, with day-to-day production schedules to maintain, are understandably reluctant to introduce "some newfangled technique." This is particularly true if the assembly line is meeting its schedules.

The Road Ahead — But this doesn't mean GM isn't making use of isotopes. There are more than 20 density-thickness gages in use in three GM plants and several radiography installations which use Cobalt-60.

And prospects are good for increased use of isotopes in manufacturing industries, as soon as certain problems are licked at the laboratory level.

For further development of production inspection processes, more radioactive materials with short half-lives are needed—or a gamma-ray emitter with short half-life.

One Possible Use—"For example," Mr. Green explains, "a gamma-ray emitter could be painted on a part moving down an assembly line and used as a 'present, not-present' indicator in the final assembly at the end of the line." If a part is missing, lack of radiation could be used to set off a signalling device, indicating unit and missing part.

"Half-life would have to be so short that the customer would get none of the radioactivity. Just as important, radioactivity would have to vanish soon enough to obviate the storage problem. Dangerous radiation could result from storage of 10,000 or 20,000 parts in a room, even when radiation from each part is in itself insignificant.

Long Range Goal—According to the GM physicist, one of GM Research Staff's long-range missions is "to translate laboratory type instrumentation into something that will be rugged and reliable . . . in a production plant."

"Unfortunately," he adds, "if the instrumentation doesn't function reliably every minute of the production shift, the whole technique might as well be stored in the library on Mars."

Accessories: They've Come a Long Way

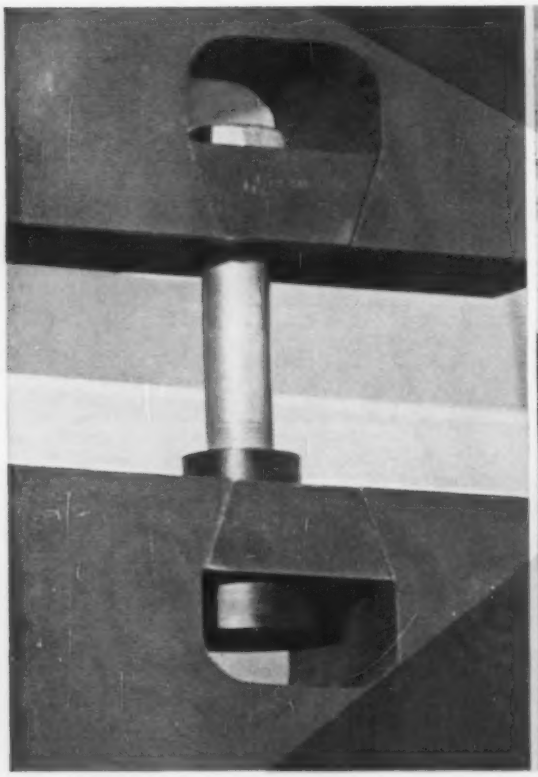
Ever wonder how many accessories you can get for your car? Pontiac says approximately 65 extras are now offered with its 1958 line. This compares with only two items when the Pontiac was first introduced in 1926.

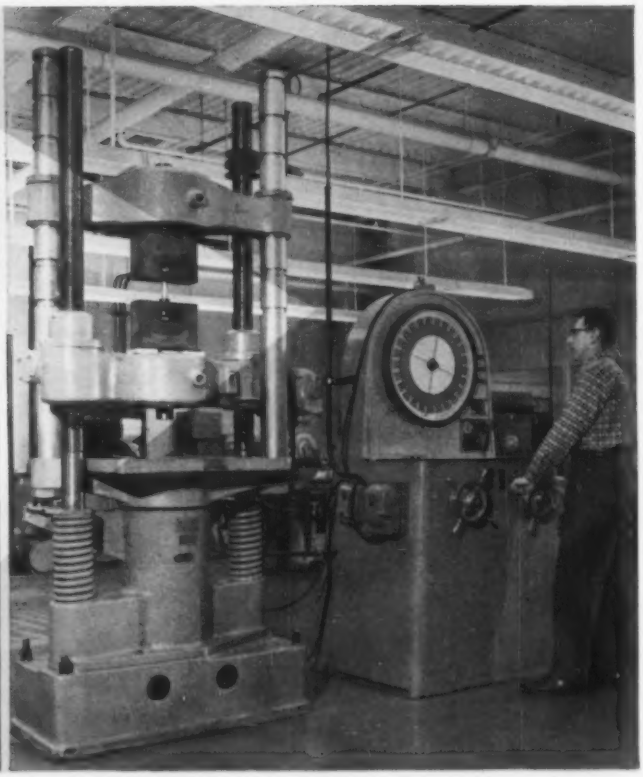
The 1926 accessories included tilting beam headlamps with foot control and a heater.

Today's optional items include air ride suspension, fuel injection, a non-slip differential, air-conditioning-heater combination, speed warning device, power steering, power brakes, and automatic transmissions.

THE BULL OF THE WOODS

THEY'VE GOT THAT GUY ON TH' SPOT--TH' CLOCK AN' TH' DRINKIN' FOUNTIN ARE RIGHT BY HIS MACHINE AN' HE'S GOT NO EXCUSE FER BEIN' ANY PLACE ELSE! HE'S TRYIN' RIGHT NOW TO THINK OF SOME PLACE TO GO, FER A CHANGE!
TAKIN' A WALK TO SEE TH' TIME ER TO GET A DRINK MAKES TH' DAY GO FASTER, BUT HE'S ALL RIGHT--HE'LL GET MORE OF A CHANGE TRYIN' TO THINK THAN HE WOULD BY GOIN' TO EUROPE--THAT GUY!
INCONVENIENT CONVENIENCES





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We break bolts on purpose at the Lamson & Sessions Company!

We do it to protect our customers . . . so *we* know and *you* know, the strength and quality of a bolt . . . one you can depend on to do the job required of it.

This machine develops hundreds of thousands of pounds of "pull"—many more than would ever be required on even the toughest holding job. We measure the "break point" and hence can tell our customers the exact margin of safety they can expect.

This is only one of the many tests to which Lamson fasteners are regularly subjected. Many times they prove that a customer can use a smaller, less expensive fastener for a particular holding purpose.

This money-saving service to customers is only one of the many reasons why the biggest bolt buyers in the country *always* consult Lamson & Sessions *first* on their fastener needs. Why don't you?

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High-Tensile
Cap Screw

The LAMSON & SESSIONS *Co.*

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More Russian Trade Is Likely

There's Pressure to Ease Strategic Goods Ban

In official Washington the change in attitude is subtle.

But the U. S. is being pushed by other Free World countries hurt by surplus production.

Still, there'll be no changes soon.—By G. H. Baker.

■ Slowly but surely, we are moving toward increased trade with the U. S. S. R. and its satellites, including Communist China.

The long list of our self-imposed restrictions on trade with the Reds won't be scrapped any time soon. But here and there in government planning circles you hear officials speaking out, a little more freely than in the past, in favor of relaxing the bans. A subtle but unmistakable change in attitude toward Communist trade and its vast potentialities is taking place.

Change in Policy — Such a change, because it represents almost a complete turn-about from the policies of both the Truman and Eisenhower Administrations, must be slow in evolving. Planning officials point out that many citizens still are firmly opposed to any kind of international trafficking with Communists. These same bureaucrats are beginning to set the stage for lifting some trade restrictions by explaining, "it's not we who have changed—it's the Communists."

Fifteen nations, of the Free World, including the U. S., have been conferring on the problem behind closed doors in Paris since February. Chiefly, the representatives at the Paris meeting are concerned with reappraising a long list of industrial commodities and products the Reds want but can not now get in comfortable quantities. High on this list are machine tools, virtually all types of production machinery, chemicals, and some food products. Under existing agreements, Free World nations do not export these strategic items to any Red nation. They sell only so-called "non-strategic" commodities.

Free World Oversupply — Because of high production and excess stocks of goods in many Free World countries, there is great pressure on the U. S. to agree to a trimming of the list of forbidden products. It is argued by some (chiefly France, England and Japan) for example, that the existing system of controls is in danger of complete breakdown unless some "realistic" adjustments in the lists are made.

And here's another delicate point to be settled in the current negotiations: The nations of Western Europe and Japan want the U. S. to agree to permit them to sell certain goods, such as machinery, to the Reds. But they do not want the U. S. to enter the markets. Stated bluntly, they want to reap the profits of trade with the Communists for themselves. They frankly do not want the troublesome prospect of being forced to compete with U. S. firms in the coming scramble for markets in Communist areas.

Labor Cleanup Is Too Hot to Handle Now

Cleanup Fades—A Senate drive for cleaner unions may already be doomed.

Senate leaders are under considerable pressure from labor lobbyists to "forget" about union reform bills now awaiting debate and final vote. Democrats and Republicans alike are anxious to avoid condemnation by labor leaders. Most would rather see the whole issue of union corruption put off until 1959—not an election year, and therefore more favorable for writing new labor legislation.

Opposes a Vote—Senate Majority Leader Lyndon Johnson is trying hard to avoid a vote on such touchy issues as the so-called "democracy in unions" proposals. These would require the election of union officials by secret ballots by rank and file members of unions. (Very few unions have this. The United Steelworkers is an outstanding exception.)

The AFL-CIO hierarchy is bitterly opposed to these proposals. Labor lobbyists are paying calls on every member of the Senate, demanding that they "lay off" this hot issue.

Settle the Issue—Senate Minority Leader William Knowland is challenging the Senate to vote the "democratic process" proposals either up or down. But it looks like he's outnumbered. Quite a few of his Republican colleagues are running for re-election and have no wish to annoy labor leaders back home. As a result, it's beginning to look like no labor legislation of any importance will emerge from the Congress this year.

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Tremendous pressures and temperatures are generated in this shock tube at Lockheed Aircraft Corp., to simulate conditions encountered by a long-range ballistic missile re-entering the earth's atmosphere. High pressure gas triggers shock waves which travel 17 times the speed of sound. Instantaneous temperatures range above 15,000 degrees F.

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Swimming Pool Sales Benefit Steel

Market Demand in Farwest Paces the Industry

Still in the middle of a thriving market, swimming pool constructors are untroubled by recession worries.

They buy good quantities of steel for pools and accessory equipment.—By R. R. Kay.

▪ Sales of swimming pools are still at high tide. Builders have little time for recession talk. Last year nationwide sales hit $600 million. And they are expected to go 20 pct above that this year.

West Coast pool builders have a strong position in their industry. Market demand for pools is greatest in the Farwest. Southern Californians are expected to put in about 9000 this year of an estimated 55,000 in the U. S.

The Steel They Buy — This whopping pool construction means a healthy outlet for a lot of metal products that go into their building, use, and upkeep. There's a good-sized market for reinforcing bars, wire mash, pipe, pumps, drains, ladders, diving-board mounts, water-heating tanks, filter equipment, and poolside furniture.

One West Coast company makes 1700 different pool equipment items. And several firms produce prefabricated steel pools.

Why They Want Pools — You often hear homeowners on the Coast say, "If you can afford two cars you can afford a swimming pool." But what are the real and compelling reasons behind the giant spurt in backyard pool planting?

They include: Trend to more living-at-home. Credit buying which puts pool cost ($3500 average) within reach of middle-income families. Keeping up with the Joneses.

And in southern California, there's the obvious reason of climate. It makes for a longer outdoor swimming season. Many apartment house and motel builders plug their pools as added rental attractions. This alone gives the pool-building industry a big boost.

Unemployment Levels

Unemployment shows some leveling off in California and the Pacific Northwest.

For the first time in six months, California's employment isn't decreasing. Some 449,000 persons were out of work in mid-March—the same as mid-February.

And in Seattle, after eight months of a steady employment slide, unemployment dropped in March. However, 94,600 remain on the jobless list. That's down about 9000 from a month earlier.

Shipyard Activity

Todd Shipyards in Seattle has laid the keel for an $18.5 million guided missile destroyer. The vessel will be off the ways in 1960. Tartar surface-to-air missiles will arm it. The ship is 430 ft long and weighs 3370 tons.

Darkness Won't Stop These Bomber Destroyers

PINPOINT ATTACKERS: Fire control systems of F-106 supersonic interceptors now in production at Convair Div. of General Dynamics Corp. can pinpoint attacking bombers regardless of bad weather or darkness.

NOW MORE THAN EVER

MARVEL HIGH SPEED EDGE HACK SAW BLADES

should be YOUR FIRST CHOICE

This is no time for "second-best" performance from your hack sawing machines. Today, every cut you make on a hack saw should be done as quickly, accurately, and economically as possible.

The *blades* you use can often mean the difference between mediocre work and top performance from your hack sawing machines. Here are 3 big advantages unbreakable MARVEL High-Speed-Edge Hack Saw Blades can bring to your cutting-off operations:

1 HIGHER PRODUCTION . . .

MARVEL High-Speed-Edge Blades are shatterproof and can be worked harder and faster than any other blade. They will withstand the highest speeds and heaviest feeds attainable on any hack sawing machine with complete safety. Machine operators working with MARVEL Blades naturally apply greater tensions, feeds, and speeds because they know they are safe from personal injury accidents. The result is faster cutting-off.

2 GREATER ACCURACY . . .

MARVEL Blades can be safely tensioned from 200% to 300% more taut than ordinary blades. Higher blade tensions produce greater rigidity of the high-speed-steel cutting edge, resulting in maximum attainable accuracy of cut-off blanks.

3 LONGER BLADE LIFE . . .

Each MARVEL High-Speed-Edge Hack Saw Blade is triple tempered to assure maximum toughness of the cutting edge. MARVEL Blades not only give you longer life, they assure a more efficient cutting life and lower blade costs.

Why gamble? Demand MARVEL Blades by name, and be sure you're getting the best blades on the market. Leading Industrial Distributors have them in stock.

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Write for the new MARVEL Cutting Tool Bulletin and the name of your nearest MARVEL Distributor.

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More Competition From Imports

And U.S. Builders Are Hard Put to Export

Wage difference is the key in the shifting tide of international machine tool trade, says NMTBA president.

Our tariffs must be boosted, he says, or U. S. builders will move some of their new capacity overseas.—By E. J. Egan, Jr.

▪ U. S. machine tool exports, once about 30 pct of annual output, are now down to about 10 pct. U. S. imports of foreign-made machines, not long ago a mere fraction of domestic production, are climbing rapidly.

Why this is, and what can be done about it were the chief topics at the just-ended 56th spring meeting of the National Machine Tool Builders' Assn. in Chicago.

Wages Make a Difference—Reviewing the problem, NMTBA president Alfred V. Bodine, president and treasurer of The Bodine Corp., Bridgeport, Conn., said, "The main reason, of course, is the price differential, which is accounted for primarily by the difference in wage rates." Average hourly pay for skilled machine tool mechanics in the U. S. is about $2.65. "In Europe it ranges somewhere between 40 cents and $1.25," he explained.

Move Abroad—"What is bound to happen under present circumstances," Mr. Bodine predicted, "is that American machine tool builders will move production capacity abroad. How can this country be ready to defend itself if its capacity is reduced?", he asked.

Questioning the wisdom of U. S. reciprocal trade policies which could force a major shift of American production capacity to Europe within easy reach of the Russians, he suggested three remedial steps:

(1) Establish tariffs or quotas on machine tool imports which will insure the national defense production capacity of the U. S.

(2) Persuade foreign countries to relax licensing and importation restrictions and agree upon a tariff arrangement which is in fact reciprocal.

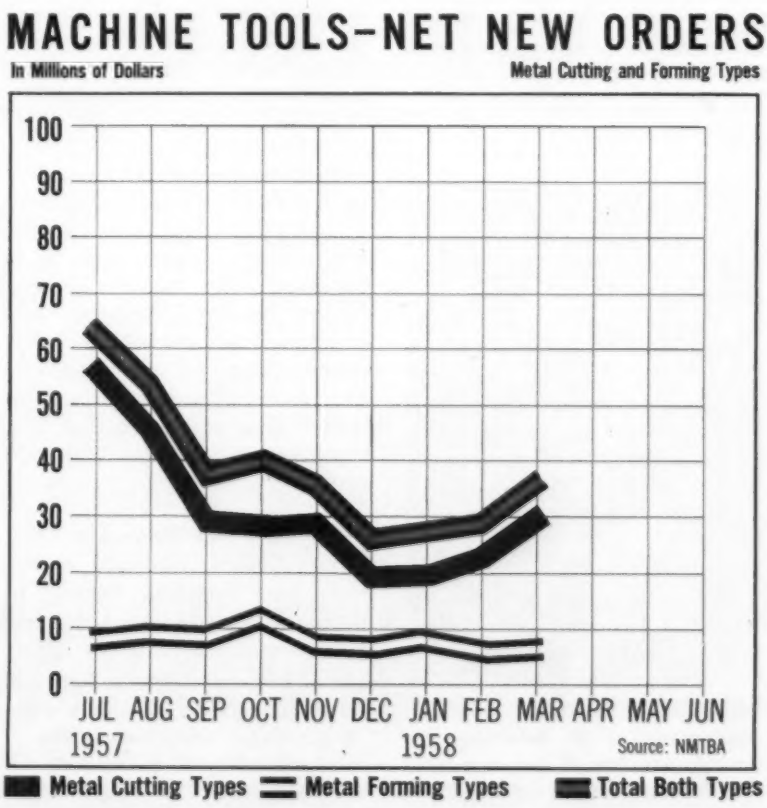
(3) Interpret the buy-American act so that it will not be mandatory for the Defense Dept. to buy a foreign built machine tool if its price is as much as 6 pct below a quotation by an American builder.

Information Please

Top tool engineers in the U. S. are interested in the concept of controlling machine tools with magnetic tapes, punched tapes, and punched cards. But they want to know more about it.

This is the chief conclusion of the American Society of Tool Engineers, after analyzing its nationwide survey.

Little Knowledge — ASTE preliminary reports on the survey judge that too many tool engineers still know too little about numerical control.



INDUSTRIAL BRIEFS

Quality Courses — An advance short course in quality control by statistical methods will be held at Purdue University, June 10-20. Subjects covered include significance tests and estimation, linear and multiple correlation and regression, single and dequential sampling for measurements, and analysis of variance.

Structure for Structurals — The Mesta Machine Co., Pittsburgh, will design and manufacture additional production and handling facilities for the structural mill at the Indiana Harbor Works of Inland Steel Co. New installation will expand the capacity of the mill to roll greater tonnages of wide flange beams.

Chopper Power—The Lycoming Div., Avco Mfg. Corp., has an Air Force-Army helicopter gas turbine engine contract totaling about $10 million. It calls for delivery of Lycoming T53-L-1 engines starting in Jan. 1959. The engines are scheduled for use in the Army Bell HU-1 Iroquois, Utility Helicopter, and the Air Force H43B Crash Rescue Helicopter.

ELECTED: Gustav O. Hoglund, Aluminum Co. of America, was elected president of the American Welding Society.

Wheelabrator Fellowships—Employees in foundry and allied industries are eligible to share in the Wheelaborator-Foundry Education Foundation Fellowship program. The program establishes 50 fellowships of $1,500 each for graduate study. Applicants must be under 28 years of age. Deadline is June 1 for those desiring to begin graduate studies in the fall of 1958.

Ninety Pct Safer—Westinghouse Electric Corp.'s Micarta Div., Hampton, S. C., has won the National Safety Council's top award for outstanding safety record during 1957. The Hampton plant showed more than 90 pct improvement over the average record for the plastics industry in number of lost time accidents per million man hours worked.

Research for Dayton — The Freedlander Research & Development Laboratories, Hawthorne, Calif., has been dedicated, marking the latest of a series of expansions by the Dayton Rubber Co. This laboratory will provide industry with facilities for basic research and development of the new miracle urethanes. The center was named after A. L. Freedlander, chairman of Dayton Rubber.

Facilities for Kaiser—Expansion at Kaiser Steel Corp.'s Fontana, Calif., plant includes a new 86-in. hot strip mill roughing train. It is equipped with Allis-Chalmers motors, m-g sets, control and switchgear. This mill will eventually double Kaiser's steel capacity. Completion of the installation of Allis-Chalmers equipment at the expansion site is scheduled for mid-June.

Casting Competition—The 1958 Design Contest, sponsored by the Gray Iron Founders' Society, is opened to designers, engineers and foundrymen throughout the U. S. and Canada. Deadline is June 20, 1958. Every entrant wins a copy of the Gray Iron Castings Handbook, edited by C. F. Walton, the Society's technical director.

Bright Liners—Chromium Corp. of America has opened a new industrial chromium plating plant at 8701 Union Ave., Cleveland. The operation specializes in the plating with chromium of cylinder liners for diesel oil engines, primarily for the railroad systems, together with marine, pipeline, transport and other industries utilizing diesel power.

Hooker Adds—The boards of directors of Hooker Electro-Chemical Co., Niagara Falls, N. Y., and Shea Chemical Corp., New York, have approved consolidation of the two companies. Under the terms of the proposed consolidation, Hooker will be the continuing company and named Hooker Chemical Corp.

All Precincts In — C. I. MacGuffie, manager, marketing, Welding Dept. of General Electric, has been elected first vice president of the American Welding Society. He will take office June 1 and will automatically assume the chairmanship of the technical council.

Problem Solver — Philco Corp. and Leeds & Northrup Co. have launched a share-cost program to develop, design and build a digital computer. It will have important applications in industrial process control and in scientific and engineering computation, including data processing. Field trial of a prototype computer system is anticipated during 1959.

Western Alliance—The Alliance Machine Co., Alliance, O., has opened an engineering office on the West Coast. To enable them to give better service, a Western Division has been organized with offices at 550 Kearny St., San Francisco 8, Calif.

Conference Call—More than 400 engineers are expected to attend a Material Handling Conference at the Penn-Sheraton Hotel, Pittsburgh, May 19-20. The conference is sponsored by the Pittsburgh Section and Materials Handling Sub-Committee of the American Institute of Electrical Engineers.

ANNOUNCING

THE FIRST VACUUM CAST CONTINUOUS HEAT TREATED STEEL ABRASIVE EVER OFFERED!

TURN THE PAGE

MEN IN METALWORKING

M. J. Pippin, elected vice president, Cone Automatic Machine Co., Inc., Windsor, Vt.

R. F. Duffy, named vice president, sales, Tubular Rivet & Stud Co., Quincy, Mass.

Paul Carnahan, appointed chairman of the board, Great Lakes Steel Corp., Detroit.

W. R. Julius, Jr., elected vice president, sales, McKinney Mfg. Co., Pittsburgh.

J. E. Puvogel, R. I. Cratch and **J. M. Thomas,** appointed vice presidents, Hoskins Mfg. Co. in charge of manufacturing, marketing and new product planning and development respectively.

Harry Engvall, elected vice president, engineering, De Laval Steam Turbine Co., Trenton, N. J.

W. D. MacDonnell, named president, Great Lakes Steel Corp., Detroit.

G. A. Hoffman, appointed asst. vice president, Metropolitan Div., Walworth Co.

H. W. Griesbach, appointed vice president, operations, Flexonics Corp., Maywood, Ill.

R. C. Simpson, elected vice president, Ducommun Metals & Supply Co., Los Angeles.

R. G. Bamber, appointed asst. secretary and asst. treasurer, and **E. J. Griffin,** named asst. controller, Spring Div., Borg-Warner Corp., Chicago.

H. G. Bauer, elected executive vice president, De Laval Steam Turbine Co., Trenton, N. J.

V. M. Roosevelt, named manager, Reynolds Metals Co.'s foil carton and printing plant, Richmond, Va.

L. K. Dowler, appointed superintendent, Cold Strip Dept. and **P. J. Pettit Jr.,** named asst. superintendent, Cold Strip Dept., Wheeling Steel Corp.'s Yorkville Works.

E. V. Kovats, appointed asst. district manager, U. S. Steel Supply Div., U. S. Steel Corp., Pittsburgh.

G. R. Semans, named director, metallurgy and **C. M. Carlisle,** named director, analytical chemistry, Jessop Steel Co., Washington, Pa.

L. M. Griffin, named director, product planning, American Welding & Mfg. Co., Warren and Niles, O.

L. W. Adams, appointed manager, V-belt sales, Goodyear Tire & Rubber Co., Akron, O.

C. G. Tournay, appointed asst. to the president, National Steel Corp.

S. R. Milliken, appointed research and development—sales staff coordinator, Foote Mineral Co., Philadelphia.

N. W. Roudabush, appointed manager, basic sales and technical service, Refractories Div., H. K. Porter Co., Inc.

W. E. Gutzwiller, appointed asst. to the manager, and **T. H. Bloodworth,** appointed chief systems engineer, Allis-Chalmers Electrical Application Dept. Other personnel changes are within the department's

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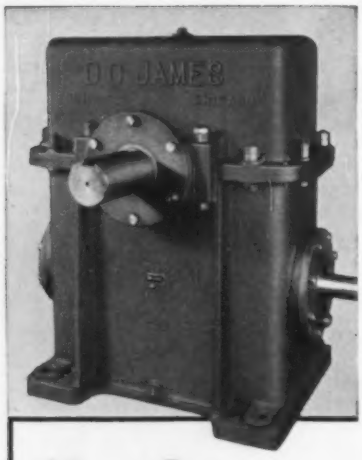

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rectifier section, **D. B. Scott,** becomes manager; **J. B. Rice,** chief design engineer, and **Harold Winograd,** consulting engineer.

W. R. Lewis, appointed asst. works manager, Electro Metallurical Co., Div. of Union Carbide Corp.

H. J. Phillips, Jr., appointed vice president, administration planning, U. S. Steel Corp., Pittsburgh.

Henry Newhouse, promoted to asst. sales manager, Axle Div., Eaton Mfg. Co., Cleveland.

E. I. Brown, appointed director, engineering, Machinery Hydraulics Div., Vickers Inc., Detroit.

H. C. Jackson, appointed superintendent, maintenance, Wheeling Steel Corp.'s Benwood Works; **W. F. Williams,** appointed supervisor, planned maintenance.

J. G. Khoury, appointed Detroit district manager, Sterling Grinding Wheel Co., Tiffin, O.

F. E. Bastian, appointed sales manager, Reynolds Wire Div., National Standard Co., Dixon, Ill.

A. I. Benson, promoted to manager, scientific applications, General Electric Co.'s Computer Dept., Phoenix, Ariz.

J. K. Campbell, promoted to manager, government sales, Philco Corp.'s Government and Industrial Div., Philadelphia.

M. W. Townsend, elected vice president, administration and finance, Handy & Harman.

H. T. Bauerle, Jr., appointed sales manager, Vidmar, Inc., Div. of Volkert Stampings, Inc., Williamsport, Pa.

G. W. Brown, elected executive vice president, Wagner Electric Corp., St. Louis.

A. S. Hellstrom, appointed chief engineer, The Youngstown Foundry & Machine Co.; **F. J. Gentile,** named asst. chief engineer; **W. M.**

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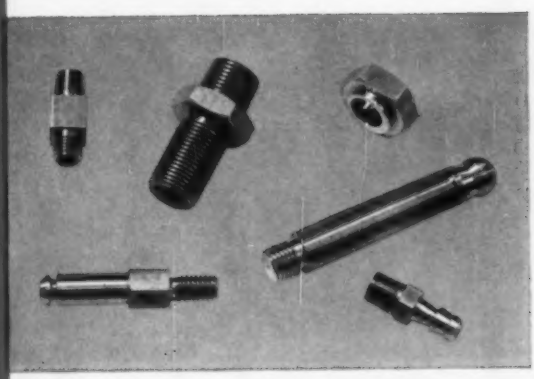

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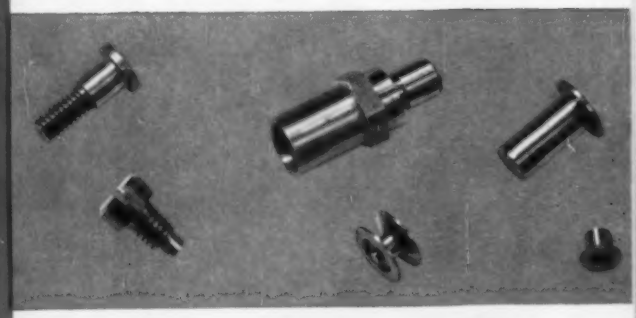

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Keil, appointed chief design engineer, roll turning and contouring lathes; **Stephen Poleschuk,** appointed chief design engineer, extrusion presses.

M. T. Schumb, appointed chief consulting engineer, Boston Gear Works, Quincy, Mass.; **S. G. Belezos,** named chief engineer.

OBITUARIES

DIED: J. N. Marshall, 60, board chairman and chief executive officer, Granite City Steel Co., in St. Louis, April 15.

F. H. Adams, president, Surface Combustion Corp., Toledo, O.

H. C. Boyd, 60, vice president, Virginia Steel Co., Inc., Richmond, Va.

J. A. Scully, 81, board chairman, Scully-Jones & Co., Chicago.

O. H. Cilley, 75, vice president and director, Raybestos-Manhattan, Inc.

H. H. Tullis, 56, former administrative vice president, Armco Steel Corp., Middletown, O.

George Georgeson, 70, secretary and treasurer, Atlas Forgings Co., Cicero, Ill.

L. E. Wilensky, 37, development engineer, The Dow Chemical Co.'s magnesium technical service and development group, Midland, Mich.

G. V. Slottman, 54, vice president, research and engineering, Air Reduction Co., Inc., New York.

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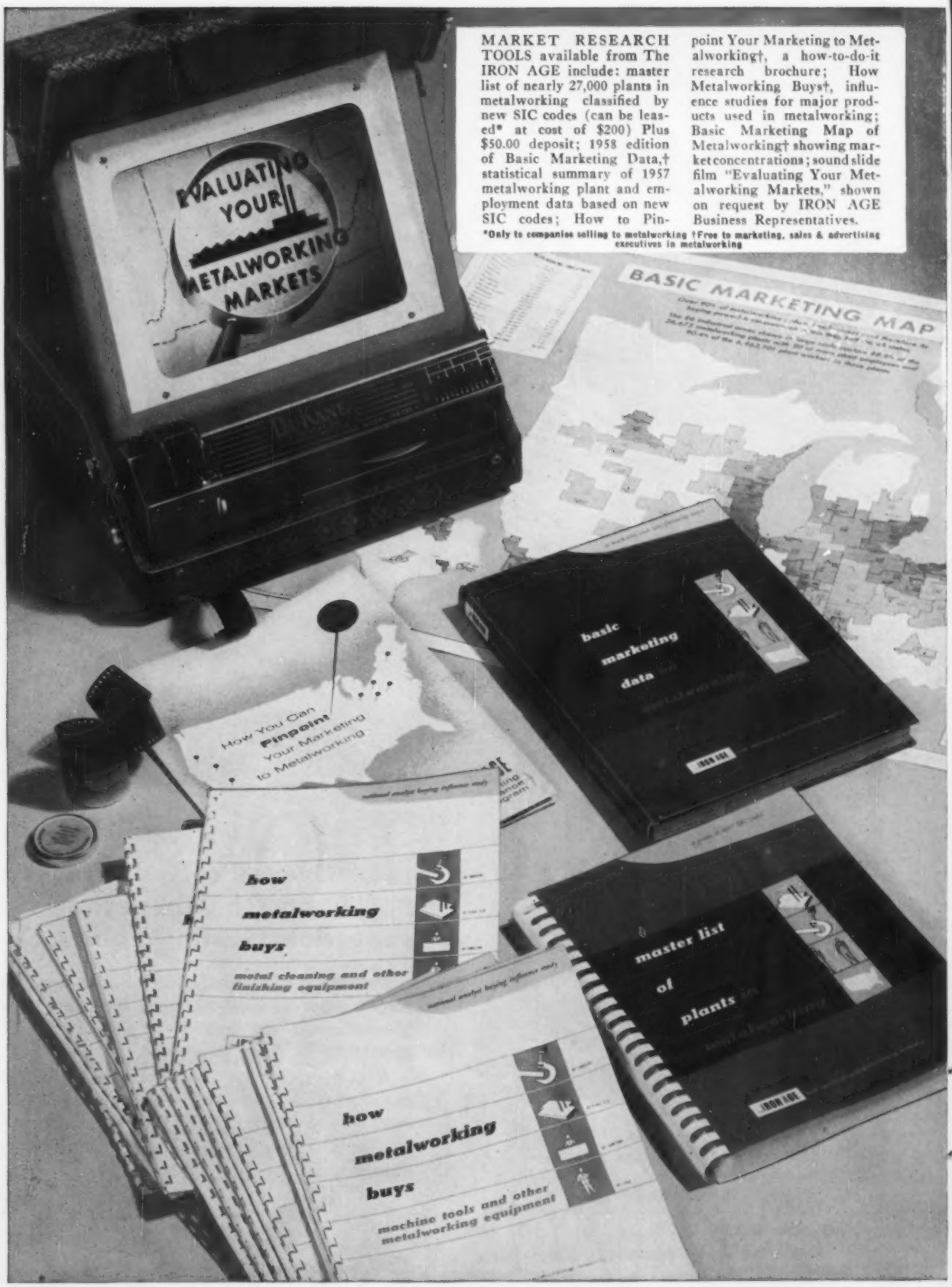
EVALUATING YOUR METALWORKING MARKETS
BASIC MARKETING MAP
basic marketing data
IRON AGE
How You Can Pinpoint Your Marketing to Metalworking
how metalworking buys
metal cleaning and other finishing equipment
how metalworking buys
machine tools and other metalworking equipment
master list of plants
IRON AGE

MARKET RESEARCH TOOLS available from The IRON AGE include: master list of nearly 27,000 plants in metalworking classified by new SIC codes (can be leased* at cost of $200) Plus $50.00 deposit; 1958 edition of Basic Marketing Data,† statistical summary of 1957 metalworking plant and employment data based on new SIC codes; How to Pinpoint Your Marketing to Metalworking†, a how-to-do-it research brochure; How Metalworking Buys†, influence studies for major products used in metalworking; Basic Marketing Map of Metalworking† showing market concentrations; sound slide film "Evaluating Your Metalworking Markets," shown on request by IRON AGE Business Representatives.

*Only to companies selling to metalworking †Free to marketing, sales & advertising executives in metalworking

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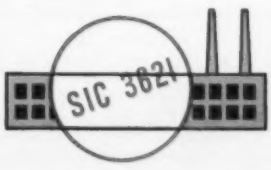
Your IRON AGE representative has complete details on these research tools . . . and the basis on which they are available. He can also show you a new IA sound slidefilm, "Evaluating Your Metalworking Markets."

How to Get More for Your Marketing Dollar in Metalworking



1. Identify the industries that make up your markets

2. Evaluate market potential of each industry

3. Gear sales efforts to market potential

4. Increase sales efficiency by preselling buying-specifying team

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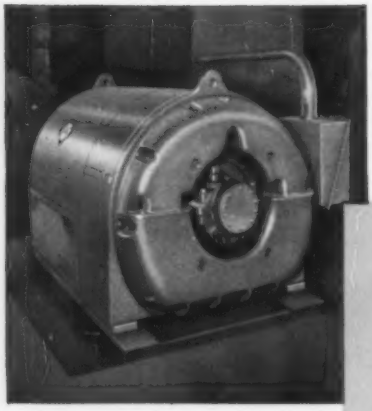

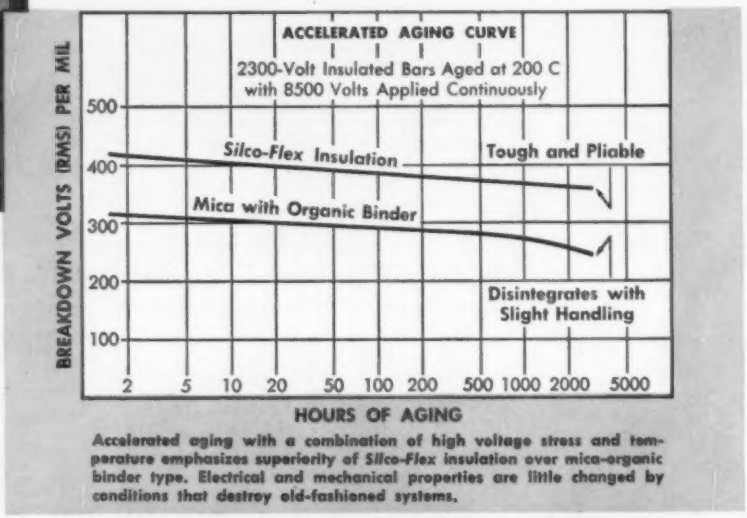

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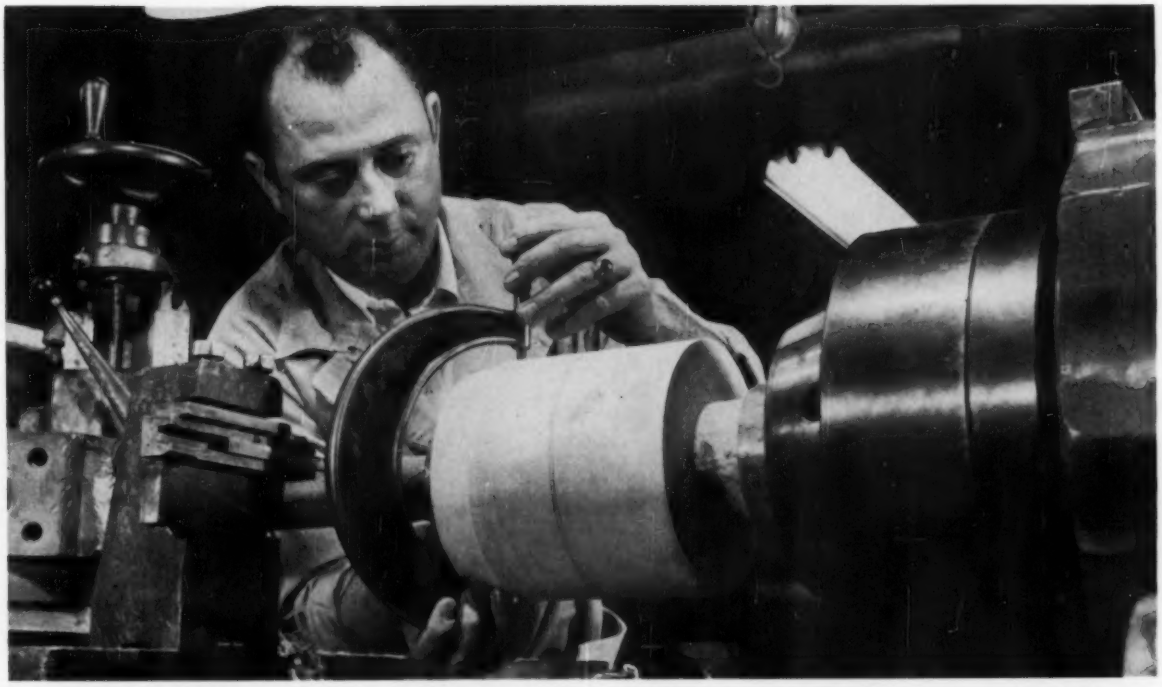

CUTS EASILY: Large tube form of glass-melamine molded laminate is turned on a conventional lathe.

How to Machine Laminated Plastics

By T. R. Silk — Plant Manager, Continental-Diamond Fibre Corp., Newark, Del.

One of these days soon, you'll run into a job that calls for a laminated plastic part.

They're being used more and more along with metals, as well as to cope with problems that metals won't solve.

Here's what you'll have to know to machine and finish them.

▪ Modern reinforced plastic materials, both laminated and molded, are turning up in literally hundreds of industrial uses today. You see them in all kinds of mechanical, electrical and chemical applications, from microminiature bearings and insulators to structural parts of rockets and missiles.

More and more, too, they're being used in conjunction with metals. As a result, many metalworking shops are having to learn how to work with these new materials—how best to cut, shear, saw, turn, drill, tap, thread, plane, punch, broach, form, draw, finish and otherwise process them into useful products.

Before getting into the specifics of machining, however, it's important first to know something about the materials themselves.

What They Are — The terms "laminated plastics" or "plastic laminates" are used loosely to cover a broad range of resin-impregnated filler materials which have been bonded together by heat and pressure to form a solid mass. Resins

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This is the first part of a three-part article. The second portion, which will appear next week, deals with shearing, sawing, cutoff, turning, drilling, tapping and threading, milling, and gear cutting.

HIGH OUTPUT: Laminates are drilled on an assembly line equipped with Thriftmaster turret heads. One man handles several machines.

BAND SAWING: Heavy-wall molded tube of phenolic-paper laminate is cut on a band saw at Continental-Diamond Fibre's Newark, Del., plant.

used are the thermosetting type (permanently set or cured by heat) and include phenolics, melanines, epoxies, silicones, and certain fluorocarbons.

High-pressure laminates are those formed at pressures of 1100 to 1200 psi and temperatures of 300 to 350°F (for various periods of time, depending on materials and thicknesses). Reinforcements commonly used in their manufacture are kraft, alpha, and rag paper, woven and nonwoven cotton fabric, glass mat or glass fiber, synthetic fibers, and asbestos.

Low pressure laminates are generally glass-fiber or glass-mat base, polyester - impregnated laminates formed at pressures under 400 psi and temperatures of about 300°F. The term "reinforced plastic" should logically apply to any laminated or molded product made from a fibrous filler impregnated with a thermosetting resin binder; actually it seems to be limited in practice to low-pressure glass-fiber base laminates.

What They'll Do—Properties of the laminate or molded part depend upon the particular filler-resin combination used. Since a large manufacturer of laminates like Continental-Diamond Fibre may use over 300 different combinations of fillers and resins, almost any desired mechanical, electrical, and chemical properties may be built into the final product.

One grade of CDF Dilecto, for example, has such high strength that it's used for body armor. Some grades offer high heat resistance (up to 5000°F for limited periods), some can be made permanently flame-retardant, while others are corrosion-resistant to many chemicals and solvents.

Two different grades may be combined to form a new laminate having the best properties of each. Or plastic laminates may be bonded to other materials such as steel, aluminum, copper, rubber, cork, plastic films, or vulcanized fibre to create wholly new materials with tailor-made properties.

Low Weight, High Tensiles—Strength-weight ratio is another big advantage of plastic laminates. Laminated or reinforced plastics are extremely light in weight (about 40 pct the weight of aluminum), yet some grades have tensile strengths of 80,000 psi or more. Plastic laminates also have high compressive, flexural and impact strengths, and are tough, resilient, and resistant to abrasion. On a pound-for pound basis. they're among the strongest materials known.

At the same time, laminated plastics often prove more economical than other materials because they can be modified or engineered for specific end-use properties. By changing the resin, the type of filler, the degree of impregnation, the curing cycle, or any combination of factors, the manufacturer can produce a material with properties that will meet the most exacting specifications.

Moreover, laminated plastics are the dielectric material par excellence; about 20 grades are approved by the Underwriters' Laboratories for use in electrical and electronic equipment.

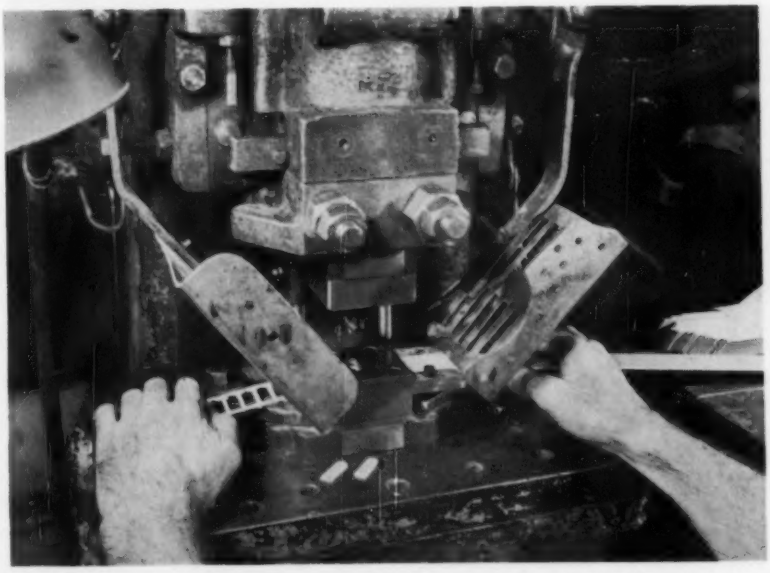
Most resins and filler materials have steadily declined in price during the past 10 years. The price per pound of some special grades, like glass-supported Teflon, still remains high in comparison to most metals; but such grades are valued more for their excellent electrical properties at high frequencies than for structural or mechanical strength, so they don't compete with other materials in these applications.

Easily Machined—Last but not least of the advantages of laminated plastics is their machinability. Whether in sheet, rod, or tube form, or macerated-molded parts such as CDF's Celoron, they can be machined as easily as most metals and woods. Actually they are often considered easier to machine than metals — except some grades of glass-base laminates, which require special techniques and tools.

Machining is done on standard woodworking and metalworking

FOR MARKING: Hot stamping, in which a die imbeds white paper in the plastic, is widely used to provide markings on the laminates.

ON HEAVIER WORK: Circular saw makes clean cut on a thick slab of phenolic laminate. Laminates are made in thicknesses up to 8 in.



PUNCH LINE: Small parts are punched from a strip of plastic laminate on a production basis. Standard vertical presses are used.

equipment, including high-speed planers and shapers. In many cases equipment can be modified to increase output or reduce costs.

Skill in machining plastic laminates may be said to consist of four ingredients: a good basic knowledge of material traits and how they affect fabrication; a sound background in machine tools and their laminations; a good helping of ingenuity; and a large measure of cumulative experience.

Whether or not a specific grade of laminate is suited to a particular application will often depend as much on the required machining operations as on the electrical and mechanical properties of the material.

Watch Tolerances — Above all, remember that unnecessarily close tolerances create unnecessarily high costs. Plastic laminates are resilient, not rigid, and all tolerances should be specified with this important property in mind—as well as the end use of the machined part. Don't hesitate to question the customer's design engineers about unrealistic tolerances—you're actually trying to save them money when you do.

Laminates have lower densities than metals, and generally lower shear strengths. These properties are desirable since they permit the use of lighter machines and allow higher fabricating speeds. In certain operations, low shear strengths permit use of standard high-speed machines such as circular and band saws, which give fine finishes and satisfactory tolerances on a high-production basis.

Because standard machine tools are designed mainly for metals, a light lathe is heavy enough to handle a high-pressure laminate even in large diameters. For efficient operation, the spindle speed should be increased by using a higher-speed drive motor. Frequently this increase in speed can safely be as much as 100 pct above the nameplate rating.

Keep Tools Sharp—Because of their resilience, laminates require greater clearance and less rake on cutting tools than do metals. Laminates tend to bend away from the cutting tools, so the tool must be kept extremely sharp to get accuracy and fine finish. Even with the keenest edged tools, however, you can't expect to hold the same tolerances in laminates that are possible with harder metals.

Dull tools increase the effects of resilience in drilling and punching; even sharp tools can result in holes of smaller diameter than the tool. This has to be compensated by using oversize tools, and by considering the thickness and grade of laminated being machined. If the piece is cold-punched, the punch diameter should be about 0.00075 in. larger than the required hole size for each 1/64 in. thickness; if hot-punched, punch diameter should be 0.001 in. oversize for each 1/64 in. thickness.

Laminated plastics are poor conductors of heat. This makes it necessary to cut down the amount of heat generated, either by cold-air jets or liquid coolants. If frictional heat isn't quickly carried away, the material or tool, or both, may be burned. Wherever practical, carbide-tipped tools should be used, since they hold a sharp edge at high temperatures.

Any operation parallel to the laminations is in the weakest direction of the laminate. If design permits, all drilling, tapping, and broaching should be done at right angles to the laminations. Where this isn't possible, care must be taken to prevent splitting of the laminate, by use of a confining jig or vise. Milling at right angles to the layers, as in cutting gear teeth, may cause delamination where the cutter runs through the work unless backing plates are used.

MOLDED SHAPE: Simultaneous heat and molding press postforms a canvas-phenolic laminate to make backup plate for sanding machine.

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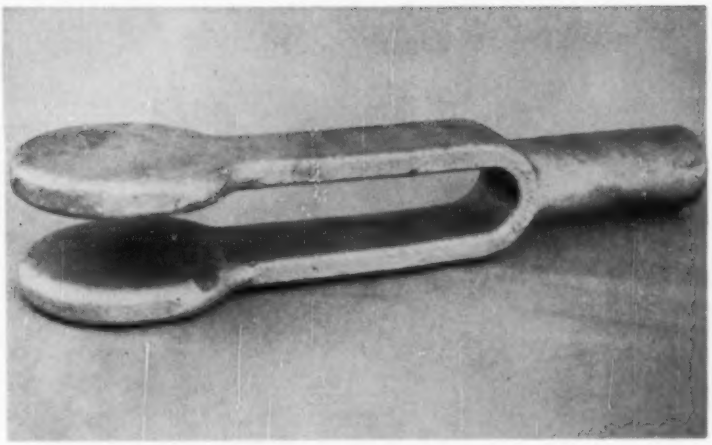

FIG. 1: Clevis is forged with 7° draft on the U-shaped portion; a simple coining operation then removes draft, saves on machining.

FIG. 2: Secondary header operation puts flat bottom on flange of large lift eye.

Extra Forging Steps Yield Special Benefits

By Herbert Chase—Consultant, Forest Hills, N. Y.

Sometimes it's cheaper to add steps than to cut down on them.

The extra die and labor costs are often more than offset by less machining later on.

Then too, forging might improve certain properties of a part, or develop traits that wouldn't otherwise result.

▪ In common with most makers of drop forgings, Endicott Forging & Mfg. Co., Endicott, N. Y., prefers that draft allowances and dimensional limits be held to Drop Forging Assn. standards. Still, the firm regularly handles unusual jobs that call for radical departure from standard methods.

Many forgings are produced in shapes normally considered impractical or impossible with equipment commonly used in forge shops. Naturally, the customer must meet whatever added die and production costs are involved. But in general, objections on this score are offset by net advantages obtained.

A simple case in point is the deep throat clevis forging, Fig. 1. Forgings of this type are not unusual, but they usually have a 7° draft on the forked portions, including the ends for the eyes. In this case, however, the two ends of the 12½ in. long piece have to be flat and parallel within ±1/16 in.

How It's Done—First, the clevis is forged with a 7° draft. Then, while it's still hot, the piece is coined to approximate flatness on the ends, using a spacer block between them. After flash is trimmed off, the ends are flattened to still closer limits by coining in the trim press die. While they're quite simple, these extra operations and extra dies add somewhat to the cost of the forging. But on the plus side, they save the customer a good bit of machining, which justifies the higher forging cost.

The lift eye in Fig. 2, made of SAE 1025 steel with a 7⅞-in. flange, posed another problem. The rounded-edge flange has to be flat on the bottom and is too large to be completely forged in a single-impression hammer die, even with a 7° draft on each side.

In the hammer, the blow is struck parallel to the eye axis and produces the rounded section for the eye ring. The flange is partly formed in the same blow, but with 7° draft on both sides and a short tapered boss on the side opposite the ring.

After trimming, which includes piercing out flash in the hole, the forging is reheated and inserted in a header die that grips the eye. Then the ram strikes the boss, flat-

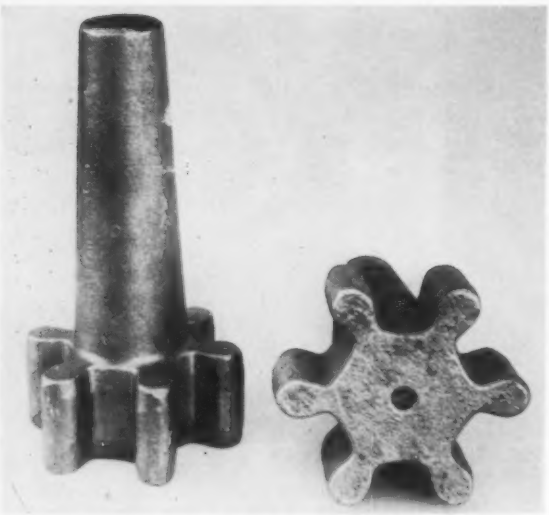

FIG. 3: Pinion forging has teeth made parallel to axis in trim die. Formerly it was flame cut from plate, machined and fitted to turned shaft.

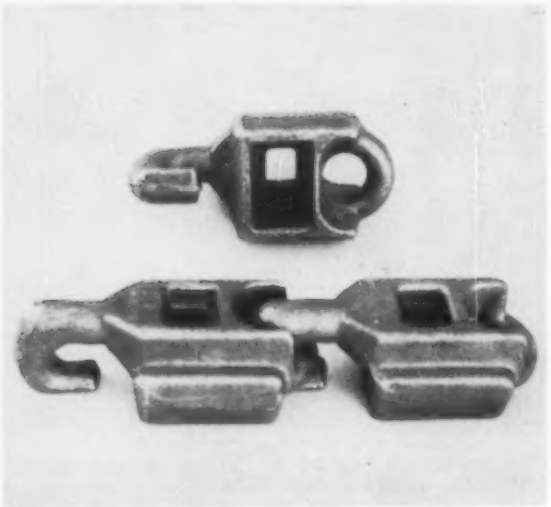

FIG. 4: Hook of conveyor-chain link is forged parallel to the flat face. While still hot, it's then twisted 90° to its final position.

tening it and forming the flange to size with rounded edges. This leaves only trimming of flash from the flange to complete the forging.

Forges Straight Teeth — Fig. 3 shows a stem pinion with forged teeth, made of SAE 3140 steel. Formerly, the customer flame-cut the 6⅛-in. diam pinion from steel plate and applied it to a separate shaft. Now, this part is forged in two impressions.

In the first impression, the tapered shaft is formed with a circular head having a small central depression and draft each way from the parting at half head thickness. The second impression forms the teeth, with draft each way from the parting at half tooth length from the end of the pinion. Both draft and flash are then removed by the trim die, making all teeth parallel to the axis.

The forged pinion has smoother tooth surfaces and better grain structure than one which is flame cut. Being integral with the stem, it doesn't have to be drilled and keyed or splined to the shaft. And the shaft needs only a small amount of machining. Although the forging and trimming dies aren't cheap, they produce important savings and a better finished piece.

Forge, Then Twist—One type of conveyor chain requires links like those shown in Fig. 4, forged from SAE 1340 steel. The piece can't be forged to final shape, but is easily made with the hook plane at 90° to that pictured and parallel to the flat face.

After forging, flash is trimmed immediately and, while the piece is still hot, the hook is twisted 90° into final position. This doesn't weaken the hook, as the metal is still plastic. Finally, flash is pierced out of the two holes after the forging has cooled.

Close dimensions must be held from the outermost point of the circular hole to the inside central point of the hook bend, because this distance determines the pitch of the chain. Distance is checked by hooking links together into about 40 in. of chain and observing what length results. The specs have proved easy to meet and the customer is well

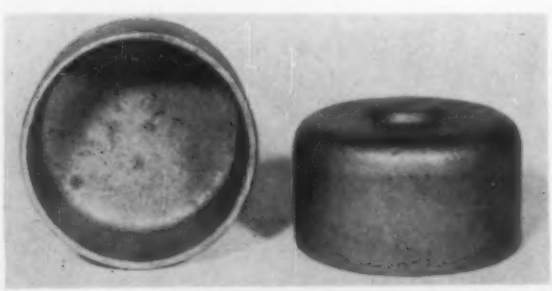

FIG. 5: Cup for rubber shock-absorber cushion is forged with flared sides, then pressed through a draw die to remove all sidewall draft.

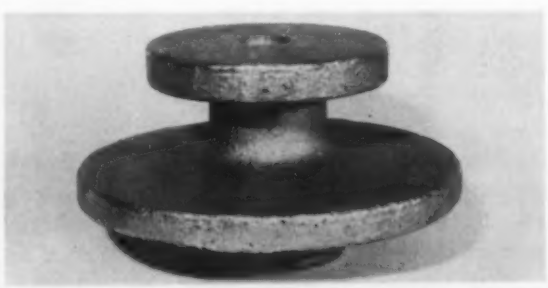

FIG. 6: Steel cluster gear forging is made from a round bar billet on an upsetter, proves much cheaper than all-machined counterpart.

FIG. 7: Hooks for clamping container lids are made on drop hammers. Die for recessed piece has three impressions, irregular parting.

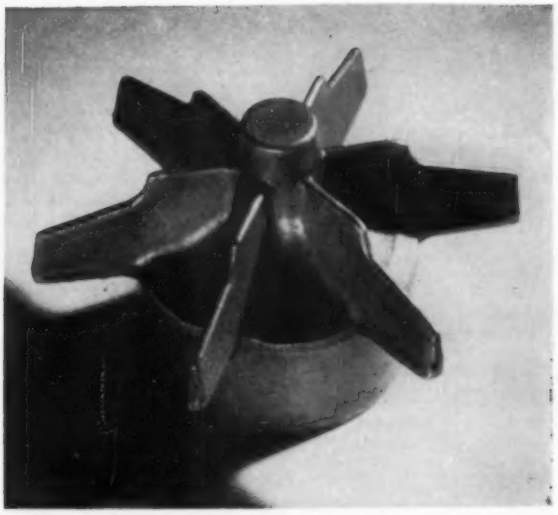

FIG. 8: Thin-bladed brass impeller drop forging requires only 3° of draft on hub and cup. Recess formed in bottom saves on metal.

satisfied with the forgings, as they have the strength and wear resistance needed and require no machining.

Draw to Final Shape—Cups of the type shown in Fig. 5 are for a shock-absorbing device that involves rubber cushions. When completed they have no draft, inside or out. As forged, however, the walls are flared out at 45° to a maximum 4-in. diam, the piece being dish-shaped. Side walls of the forging are 3/32-in. thick; the bottom is 9/32 in. thick, except at the central boss.

Trimming is done after the forging has cooled. Then, a press is used to force the cold piece through a draw die to give it the final 3-3/32 in. OD and 2-9/32 in. ID, as well as its final height of 1⅝ in., exclusive of the boss. It needn't be trimmed after drawing.

Unusual Job—Cluster gear forgings such as in Fig. 6 might not be considered feasible by many forging shops. This one was made by Endicott of round billet from 2¼-in. diam SAE 1020 bar stock, using only an upsetter. First, the billet is clamped in the die and struck by the ram. This upsets the smaller flange and produces a tong-hold recess at the center. Then, the flange is trimmed in a second die.

When the forging drops from the die, tongs are inserted in the hole and the reversed piece is inserted in a third position; the flange already formed is gripped in the die, and the first upset is made on the other end. Then, the forging is shifted to the last upset position and the next blow gives the large end its final shape. This completes the large flange, including its stepped portion; the neck remains at original bar diameter. In the final die position, the large flange is trimmed.

Forging saves much metal, compared with machining the cluster gear from solid bar or even from a partly upset forging made without a neck. There is also a more favorable grain structure.

Irregular Shapes—The forgings of SAE 1025 steel shown in Fig. 7 are used to fasten container covers. One of the pair has a cylindrical shank that's later threaded to take a nut. Next to this shank is a somewhat T-shaped section that passes through and makes a rough sliding fit in a hole of the same shape pierced in the other piece.

The shanked piece is forged off a 1⅝-in. bar from which it's cut after forging. The other piece requires a die having three impressions (for edging, blocking and finishing) and an irregular parting. It has to be forged in an inclined position. After forging, the piece is trimmed hot and then set into a fixture that keeps it inclined for piercing the irregularly shaped hole.

At Endicott, as in many other shops, steels of many types are forged, including various stainless steels. Some nonferrous forgings are also produced.

The pump impeller in Fig. 8 is made of No. 250 forging brass (AMS 4612). In this forging, draft is only 3° on the solid hub and on the outside of the cup-like portion. Blades have a taper of 0.010 in. per in. on a side, but are only 0.060 in. thick where the radius on the thinner edge ends. These blades continue to the bottom of the recesses between blades. The cup is recessed from the other side to save metal and avoid sections of excessive thickness.

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Tape-Controlled Miller Saves on Short Runs

Automation may yet find its biggest market in small shops.

The tipoff is the growing use of numerical controls to guide individual machine tools.

This tape-controlled 3-D miller machines a wide range of parts accurately and economically.

▪ Automated machining is no longer synonymous with mass production. In fact, it may become even more renowned as the cheapest and best way to machine short runs of parts—even as few as a half dozen pieces.

If this happens, the credit will go to something called "numerical control." Numerical control systems applied to machine tools eliminate the need for skilled operators; they replace the human hand and eye with a ribbon of punched or magnetic tape—or the familar punched card.

As a result, shifting from one tricky machining job to another on such a machine is almost as quick and easy as changing a reel of film in a movie projector.

Miller Shows Why—Take the new milling machine just developed by the Morey Machinery Co., Astoria, L. I., and General Electric's Specialty Control Dept., Waynesboro, Va. It was built to prove that automation is economically feasible for small-lot production.

The 3-D profile and contour milling machine is controlled by instructions programed on a one-inch wide, 14-channel magnetic tape. These taped commands guide the milling cutter through continuously changing vertical, horizontal and longitudinal paths at rates up to 100 ipm. Tolerances on milled dimensions are held to 0.001 in.

Fast and Powerful—The machine is powered with speeds and feeds to mill any material from nonferrous alloys to the toughest steels. Its geared head is driven by a 30 hp motor and has a speed range of from 20 to 3600 rpm. The miller will machine workpieces as large as 48 x 48 x 12 in.

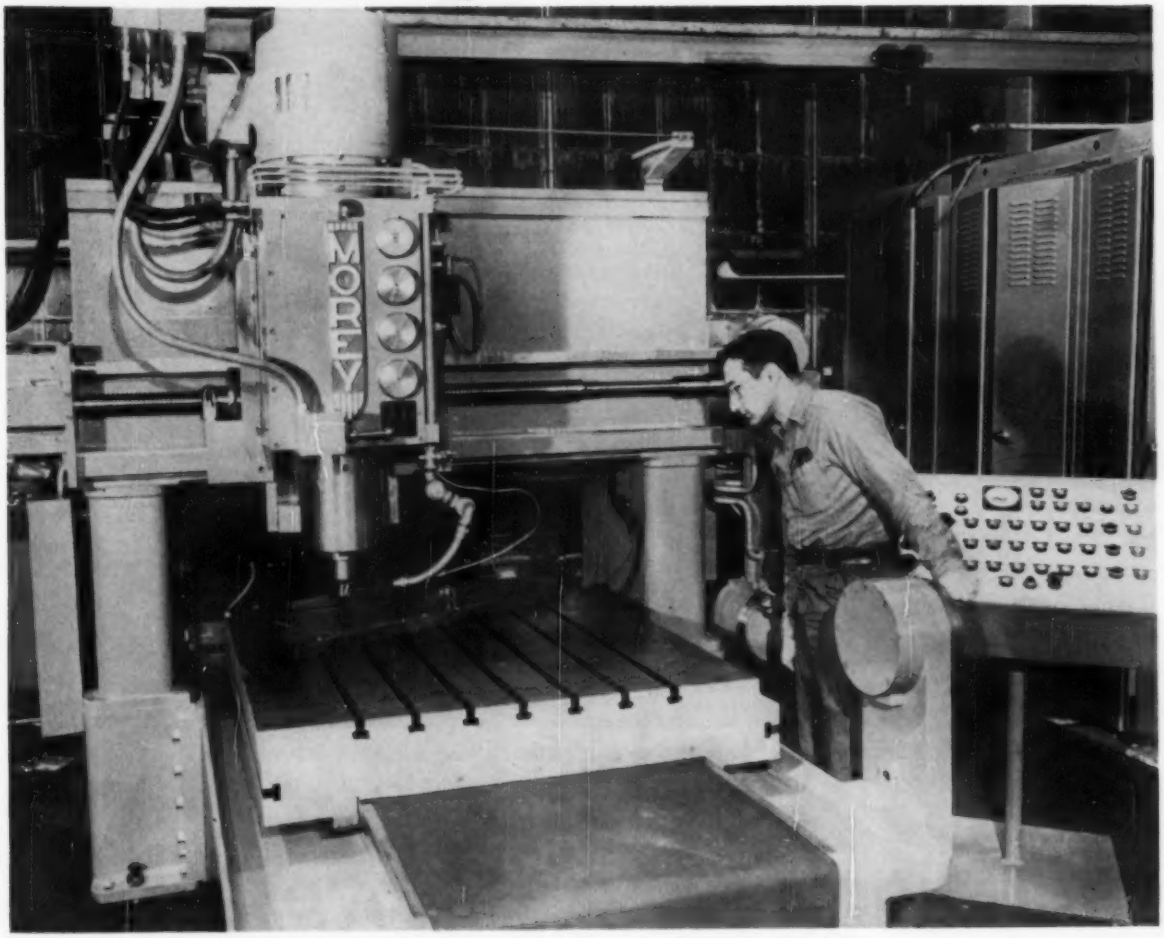
The tape control unit can be bypassed in favor of manual operation at any time. In such cases, the operator would use the machine's handwheels and micro dials for positioning the milling head and machine table. Pushbutton controls are also provided to actuate cutter and table travel as in any conventional milling operation.

Leonard Morey, president of Morey Machinery, feels that numerical control on individual machine tools puts a long string of benefits within easy reach of small-lot producers.

"A numerically controlled machine will produce most complicated parts with minimum setup, in small lots, without skilled labor and yet will assure accuracy and repetition," he claims.

Cuts Inventory Cost—With numerically controlled machines, management will realize savings not only in actual machining time, but also in inventory reduction, Morey be-

RULES OUT MISTAKES: Correct instructions are coded on 14-channel magnetic tape to insure a perfect machining job every time.



TOP SKILL UNNECESSARY: Operator uses handwheels to position the table before tape control takes over.

lieves. He attributes the inventory saving to the fact that parts need be made only as they are required.

Numerical controls also eliminate the need for jigs, templates and attendant storage space, Morey feels. He points out that by comparison, the quick-change tape reels take up negligible space.

"Another great advantage of numerically controlled machines will be the tremendous reduction in lead time for tooling." Morey maintains.

Cites Savings Facts — Dr. L. T. Rader, general manager of General Electric's Specialty Control Dept., offers some examples of savings achieved by using tools equipped with the firm's numerical controls:

1. One user reports that the cost of wing spar templates has been cut to $4 per foot from a previous cost of $25 to $30 per foot.

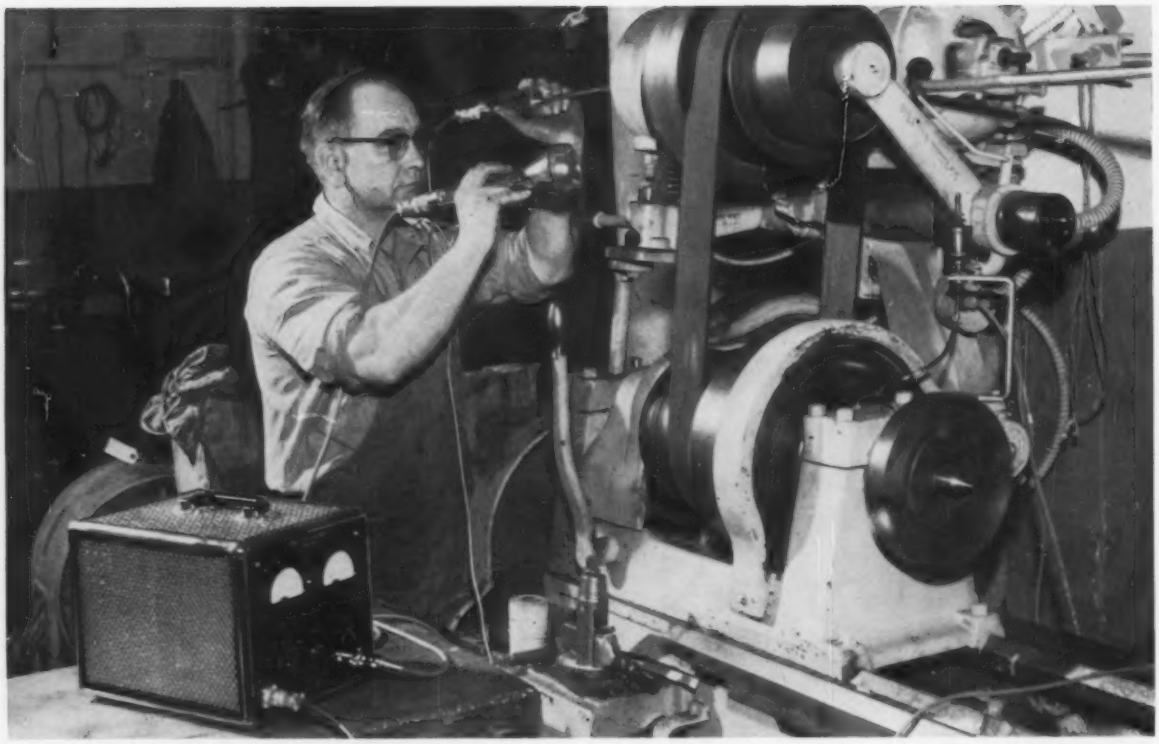
2. Another airframe manufacturer claims minimum savings of 50 pct on a wide variety of parts.

3. Numerical control gave still another company a 61 pct saving on one lot of 85 parts, and a 69 pct saving on two lots of 164 parts. These figures do not include the reduction in rejects or the shortened lead time made possible with numerical control.

In considering automated machines such as the Morey miller, top management men almost automatically ask two questions, Dr. Rader says. The first is, "Why automate?" The second is, "When can I automate economically?"

Need is Urgent—Dr. Rader gives two answers to the first question. Pointing out that the U. S. will require 40 pct more goods and services by 1965 from a labor force with only 14 pct more people, he says: "Automation is the logical, practical and most beneficial solution for all." And he declares that problems of national defense and lack of lead time to build up armaments make automation a matter of "critical urgency."

He admits that the question about the economics of automation is more difficult to answer. "Each management must consider its individual application." But he maintains that, "numerical control automation for short production runs, on complex parts, is economically sound over a wider range of applications than is now in use."



PROBES INNARDS: Vibration analyzer is used to troubleshoot lathe for excessive vibration.

Vibration Analysis Proves Worth in Production

First it was a lab curiosity. Then it went into maintenance work, to speed troubleshooting and spot future problems.

Today's vibration analyzer goes even further; it's proving a valuable production aid.

By **D. L. Bernhard** — Manager, Application Engineering, International Research and Development Corp., Columbus, O.

▪ Any machine with rotating parts will vibrate. Just how it vibrates provides important clues to the conditions of its various parts—loose, unbalanced or worn components will show up fast in the form of vibration, even when to all outward appearances the unit is sound.

This fact can be put to work in two ways: first, by manufacturers to check their products and correct any minor faults before a machine is shipped; and second, by equipment users to locate points of wear or imbalance before they become serious.

Actually, vibration analysis goes a step further than preventive maintenance where machine users are concerned. The system has also moved into production departments as a means of quality control, lengthening tool life and making the most of machine capabilities.

Instruments Are The Key — Today's accurate, lightweight, easily used instruments make all these things possible. A typical portable analyzer built by International Research and Development contains a hand-held vibration pickup which provides input to an amplitude meter and a frequency meter. The amplitude meter is directly calibrated to read displacements from microinches to tenths of an inch, while the frequency meter is directly calibrated in cycles per minute. The unit has a variable frequency filter for tuning to each source of vibration without interference from other components and

BALANCING AID: Fan builder removes excess weight from blades after the vibration analyzer pinpoints location and amount of imbalance. It checks parts in place, saves setup and production time.

while the entire machine is running.

A stroboscopic lamp, also triggered by the vibration pickup, "freezes" faulty parts and locates the heavy or light spot. Thus the analyzer can detect and measure vibration, and pinpoint the source. And when imbalance is the cause, the unit permits in-place balancing without costly dismantling of machines.

Vibration problems crop up in a variety of machinery and equipment, from lathes to steam turbines, and can stem from many causes. Experience at the National Water Lift Co., Kalamazoo, Mich., is a good example of how vibration analysis will solve them.

Two Hours vs. Two Weeks— In one case, a new grinder was being checked out on the production line. It wouldn't produce the required 0.0001 in. concentricity. After two weeks of removing and reassembling the spindle, bearings, motor and clutch, the analyzer was brought in. In two hours the problem was diagnosed and corrected: gear teeth on the countershaft weren't meshing properly; this caused vibration, which in turn affected concentricity.

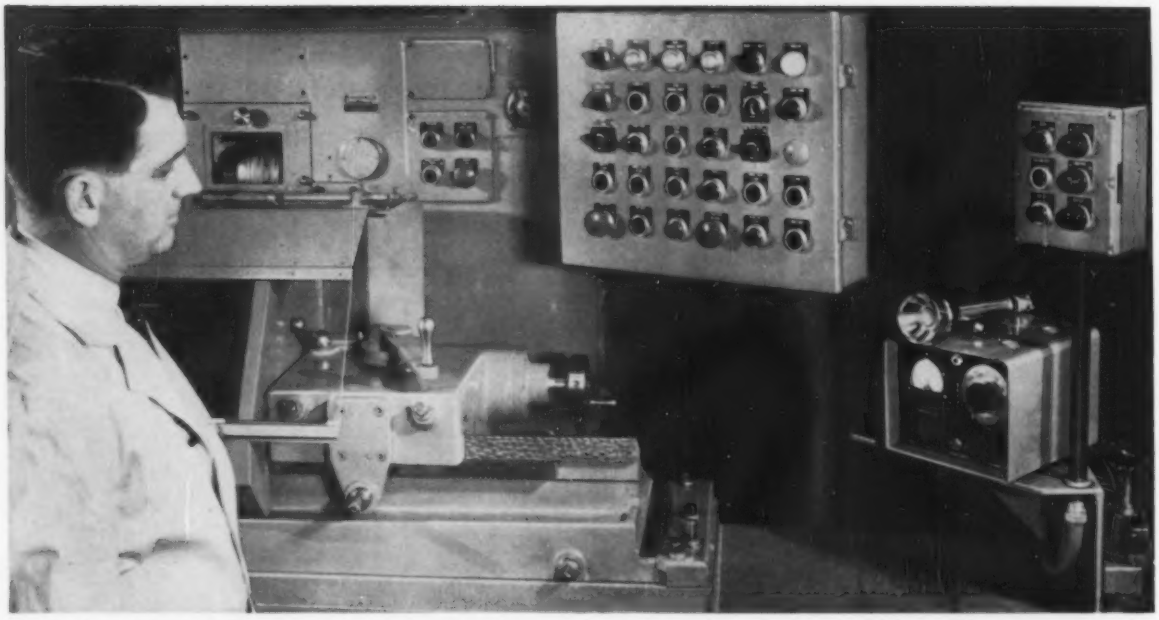
In another case, a lathe motor was sent to a service shop for balancing; it was thought to be causing the lathe's poor concentricity. But when the repaired motor was reinstalled no improvement was apparent.

The analyzer found that the drive pulley was the real source of trouble. It had been balanced separately; this time the analyzer was used to balance it directly on the motor and at operating speed. The cost of dismantling the motor, balancing it unnecessarily, and loss of production could have been prevented if a vibration analysis had been made first.

Now, on receiving a complaint of poor finish, out-of-round or failure, the machine is first analyzed to determine the source of excessive vibration. In fact, any type of complaint triggers a vibration analysis before other steps are taken. Belts, gears, bearings, shafts and spindles are checked. Then repairs are made according to the information gathered by the analyzer.

Finds Many Uses — It used to take four hours to achieve a non-precision level in balancing a grinding wheel; with an analyzer it's now done in less than 20 minutes, to a high degree of precision and without removing the wheel from the grinding machine. New precision drive motors are balanced to greater accuracy (maximum of 50 micro-inches displacement) before installation on machinery. Floor vibrations are studied to determine the best location for a precision machine; vibration isolators are checked for efficiency.

Another firm reports that holding a low vibration level and keeping



PERMANENT PART: Analyzer is permanently mounted on Sheffield grinder to monitor vibration; when it becomes excessive, red light warns operator. Then the same instrument helps correct the trouble.

grinding wheels dynamically balanced has resulted in a 20 pct saving in wheels, and an increase in production due to less balancing time. Balanced wheels have also reduced dressing diamond consumption 30 pct, because of less frequency and lighter cuts.

Plant equipment maintenance is another big area where vibration analysis cuts costs.

Spots Blower Trouble—In one instance, a blower and fan assembly had been dismantled and the bearing replaced three times in attempts to eliminate excessive vibration. This required several days, but still didn't do a good job. Finally, a vibration analyzer provided a very simple solution: it located a bent shaft. The shaft was repaired and the blower has been trouble-free ever since.

In another case, a small turbine was taken out of service for excessive vibration. The rotor was balanced in a balancing machine and replaced in the turbine; excessive vibration still persisted. With an analyzer, the maintenance men quickly found that vibration was caused by the coupling; the coupling was then balanced in-place, which took only a few hours and eliminated costly dismantling.

As a result, the firm set up allowable vibration standards for all rotating equipment. Balancing and maintenance work is now scheduled efficiently. Periodic checks and carefully kept records show the history of each piece of equipment.

Pays Off—The system of periodic checks paid big dividends on a 450 hp motor. Readings indicated steady increase in frequency of vibration, even though amplitude remained the same. This pointed to a change in bearing conditions. Inspection showed dry bearings; the lubricating method was changed, preventing a bearing failure.

Monarch Machine Tool Co. has worked out an inspection routine which catches the occasional vibrating lathe that comes off the assembly line. A series of close tolerances has been set up in chart form for each key rotating part of each model lathe. Inspectors check each of these points for vibration and compare readings with the master tolerance chart.

Several machine tool builders formerly bought precision motors to install on their equipment. Now they are saving money while improving the quality of their products by buying commercial motors, classifying them as to level of vibration with an analyzer, and using the same analyzer to precision-balance those with excessive vibration.

For Field Service—Manufacturers of all types of equipment, ranging from washing machines and machine tools to air-conditioning systems and steam turbines, are equipping field men with vibration instruments to check out customer complaints.

The Sheffield Corp., Dayton, has gone a step further. Realizing the effects of vibration on finish and concentricity, Sheffield is now installing vibration-monitoring systems on its gear and form grinders. Thus the firm's customers immediately know when vibration becomes excessive, before poor finish and off-tolerance work develops. At the same time, the monitor system is used to pinpoint the cause.

Gravity Speeds Truck Loading, Unloading

When you're forced to transport large sheet metal parts from one plant to another, it pays to set up a workable system.

It's surprising how the simple force of gravity can do the job for you.

■ What's the most effective way of handling large sheet metal parts when you assemble them at some distance from the stamping facility? Engineers at Cadillac Motor Div., Detroit, faced this problem when they set up the sheet metal department in a plant some miles from the main factory.

After careful study they devised a system of portable racks. Truckers load and unload these in minutes with the aid of gravity rather than muscle power.

Racks on Rollers—Each receiving dock is inclined away from the trucks, and each shipping dock is inclined toward the trucks. Even the beds of the trucks are inclined. All the trucker needs to do is to throw a lever to load or unload the rollerized racks.

The portable shipping racks are also used for in-plant transportation of parts that nest conveniently, such as hoods, gas tank halves and bumpers. Parts go directly from the last press operation into the racks. The loaded racks are carted to the inclined roll conveyor by trackless train.

Fender stampings, which don't nest, are transported to the storage area by overhead conveyor. Conveyors then take them to the loading dock where they get loaded on the racks for shipping.

Volume Counts — Volume of parts to be handled was an important consideration. The firm's sheet metal operation is on a two-week float system. Efficient operation requires adequate storage and a simplified system to handle and ship large, bulky parts in volume. This method of material handling was the answer to both.

The gravity system eases both storage and space requirements. Further, studies point out time savings in loading and unloading trucks.

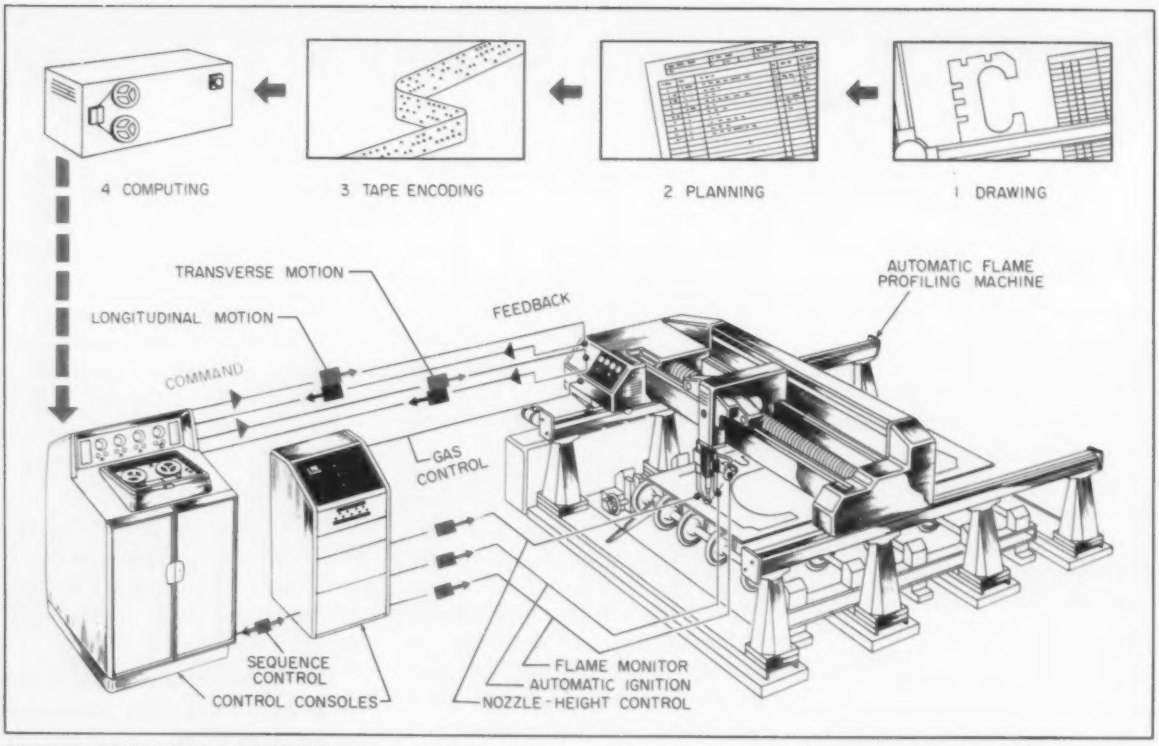
In addition there's less damage to parts in shipment. Wear and tear to truck interiors is reduced, since there's no contact between truck and racks. Safety is another gain, since there's less manual handling.

Not for Small Parts—Stacking of small stampings has proved impractical. When small parts are nested in transportation pans, the weight of the pan and contents becomes too great for truck shipment. In fact, the size of the pan is such that loading by this gravity method will require either changing the pan or altering the truck interior.

Cadillac finds the gravity method most effective with large and bulky parts. But parts should not be in a finished state, since racking can damage surface finish.

The higher the volume, the better the system works. It's advantages are apparent where hauling time is fairly short, and loading and unloading time becomes a big factor.

READY TO GO: Bar locks rack in place to prevent shifting. Trucker need only throw a lever to unload at receiving end.



SHORT CUT TO PROFILING: Computer is the key to speed up between drawing of part and profiling.

Computer Cuts Steps In Flame Profiling

Setup time often rules overall efficiency in flame cutting.

Computer control can cut the time to almost nothing.

Ease of setting up is just one of the benefits you get from a computer system.

▪ Flame cutting is at its best for cutting irregular shapes. But even on automatic units that follow full-scale templates, there have always been steps with a good deal of hand operation.

A new flame cutting unit tackles this problem by following instructions from a magnetic tape. Prepared by a computer, the tape eliminates many of the conventional stages between the drawing board and the cutting machine.

Don't be misled by the fact that there's a computer involved. You don't have to own one. A centralized computer service provides purchased time as required. The user sends coded paper strips to the computer center and receives back reels of magnetic tape.

Cuts Costs—It has been estimated that the new unit, developed by British Oxygen Gases Ltd., London, England, in cooperation with Ferranti, Ltd., will save as much as 40 pct of the present cost of profiling plates.

Right at the drawing board, all dimensions are given as positions relative to the axis about which the machine works. A planning sheet is prepared from the drawing board, listing input data, such as cutting speed, kerf width, and preheat time. It also includes the sequence of operations with points of change and types of curves.

The planning information is then copy-typed on a teleprinter which produces a paper strip with a pattern of holes. A typed reproduction can be cross-checked with the planning sheet.

Computer Takes Over — The computer reads the paper strip and produces a magnetic tape. All the

work has been done now, for this is the tape that is inserted in the control console.

All that's necessary in setting up the profiler is to locate the center of the cutting nozzle at the datum position, with the workpiece located against stops. From then on the machine proceeds under control of the magnetic tape.

In addition to positioning the nozzle, the magnetic tape controls the other flame cutting adjustments. It continually senses nozzle height and keeps the correct distance between nozzle and the plate.

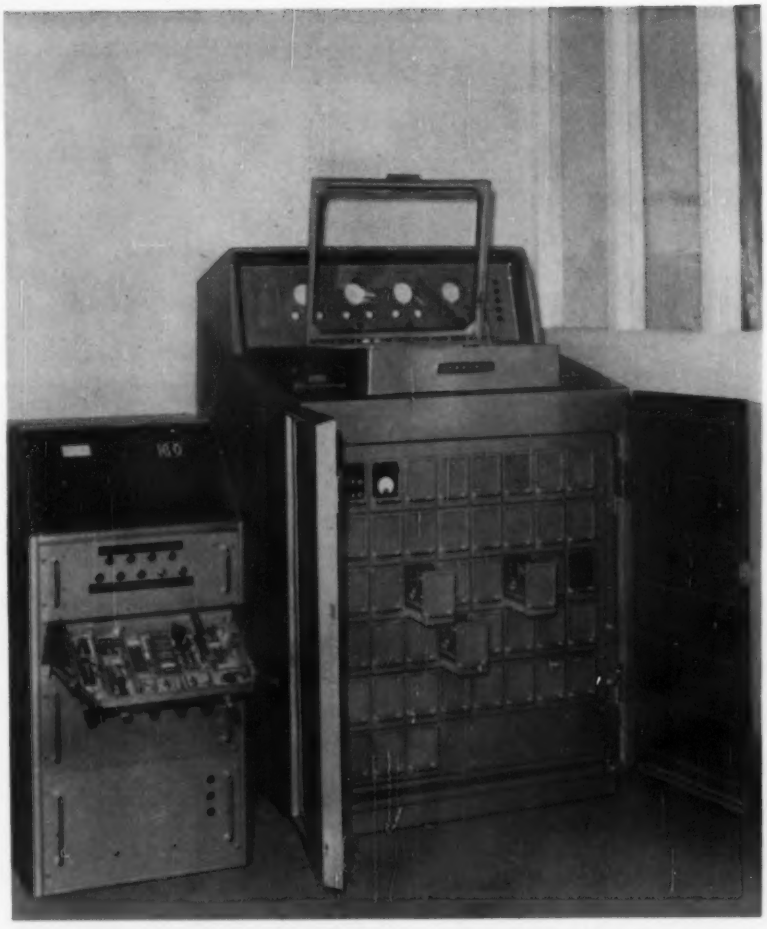
Automatic Ignition—An impulse from the magnetic tape sets off the ignition system for lighting the gases. A flame-monitoring unit confirms the presence of the pre-heat flame. In the event of failure of the flame, the unit shuts off the system. A restart sequence can be initiated immediately.

If any part of the equipment ceases to function, a continuous monitor shuts the unit down before any damage can be done to the work.

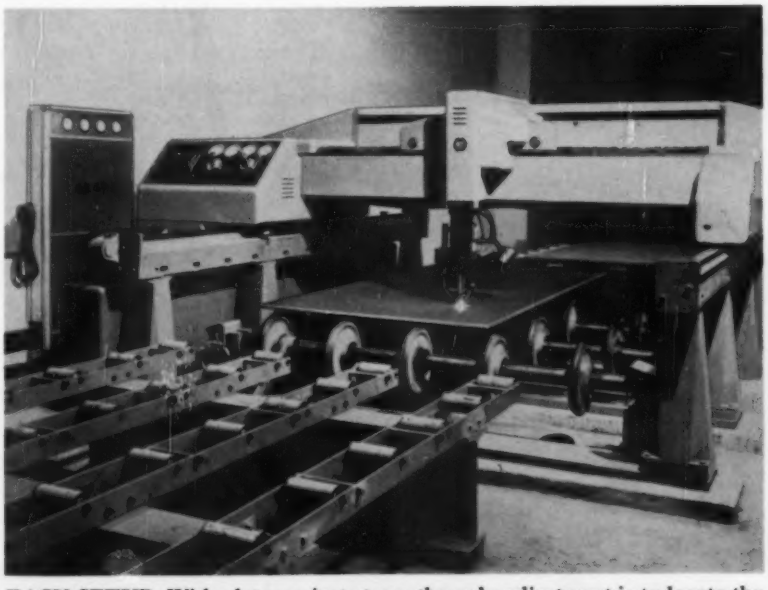
The initial machine, developed for experimenting, is restricted to cuts on plates up to 6 x 7 ft and 2 in. in thickness. It's a small unit with a single nozzle and a simple work table with three sections for loading, cutting and unloading the work.

Production Scale—The production machine differs largely in layout and size. It's a two-sided type that will cut plates up to 12 x 40 ft. Power driven rollers move plates from the loading area up to stops on the cutting area. After cutting, each plate moves forward to the 50-ft unloading area.

The automatic unit should find particular application in those branches of engineering concerned with the fabrication of heavy steel plate. The field includes shipbuilding, structural engineering, the making of boilers, tanks and other forms of pressure vessels, earth moving equipment, and heavy agricultural machinery.



REPLACES MANUAL CONTROL: Put a magnetic tape in control console (right) and all operating functions are automatically controlled.



EASY SETUP: With plate against stops, the only adjustment is to locate the center of the nozzle at reference position.

Electroforms Feature New Type of Nickel

Coated with nickel of unusual hardness and density, a new kind of electroform offers high resistance to impact and wear.

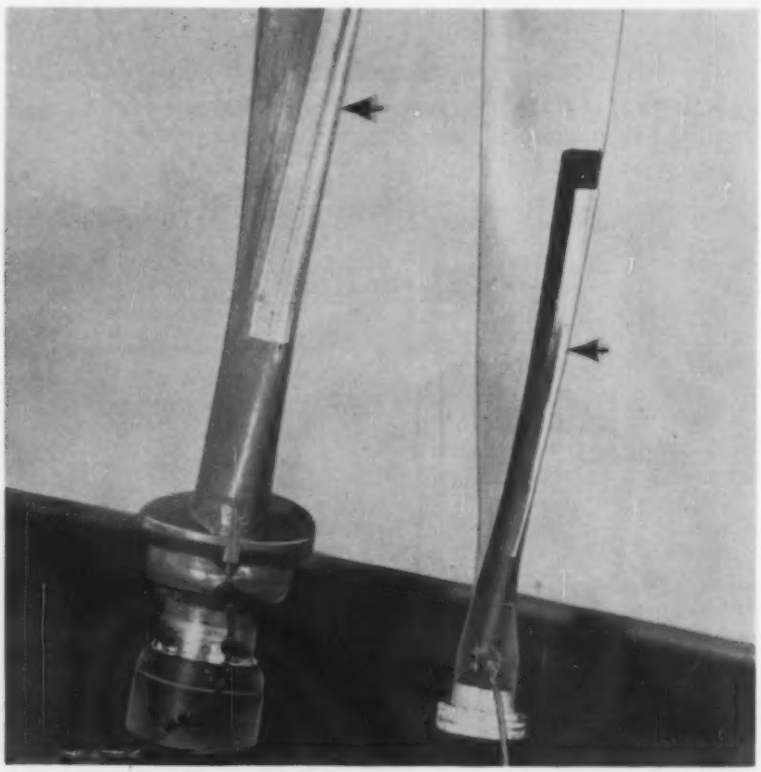
The material is already finding use in aircraft, and may turn up soon on autos and household products as well.

▪ Recent work on a novel method of making electroforms led to the discovery of a new kind of nickel. Called Micrograin nickel, the new material claims to combine high hardness with unusual flexibility.

Developed by Metachemical Processes Ltd., Crawley, England, the electrodeposited nickel has high resistance to abrasion and impact. Electroforms of the material are being used on leading edges of aircraft propellers, to guard de-icer elements against the impact of hail or stones during landing and take-off.

Extra Fine Grain — Tests indicate that the excellent properties of the new nickel electroform result from its very fine grain size. Using a standard nickel sulphate bath without organic addition agents, grain size is so fine that the material cannot be etched for micrographic analysis.

The fine grain seems due to characteristics of the electrically-conductive plastic sheet on which the nickel is deposited.



PROTECTIVE SHEATH: Nickel-coated electroforms cemented to leading edge of propellers guard de-icers against hail and stone damage.

In making a Micrograin nickel electroform, a master mandrel of metal is first cast to the exact contours of the propeller, wing, or other surface to be protected. An electrically-conductive plastic coating, several mils thick, is then applied.

Compressive Stress — After a flash coating of copper has been deposited, the unit is placed in the nickel plating solution until the desired thickness is built up. The nickel coating obtained is under compressive, rather than tensile, stress.

Brinell hardness of the nickel is as high as 600. Yet it can be easily bent without fear of cracking. Even shapes with reentrant surfaces may be plated on the mandrel, removed, and then closely fitted to the finished product.

Right now the main uses of Micrograin nickel are in the aircraft industry. Many other applications look promising, however. Boat propellers, for example, may be protected against cavitational erosion.

New Horizons — Kitchen counter tops and splash boards may some day be thin layers of Micrograin nickel. Kneeholes in desks, always a point of wear, can be protected against bumps from chairs by narrow strips of this material.

Even automotive bumpers might be left rough and finished with a carefully shaped electroform. This would eliminate laborious grinding, polishing, and sealing prior to chrome plating. One European car maker is now testing such electroforms.

In all such applications, the electroform is cemented in place with an epoxy adhesive.

"STRONG. FIRE-RESISTANT. CORROSION-RESISTANT. THAT'S WHY WE USE WEIRZIN® IN OUR STUD SYSTEMS!"

says G. A. Stevenson, vice president of Penn Metal Company, Inc., Parkersburg, W. Va., maker of PERMALOCK nailable metal stud systems.

"Broadly speaking, our choice of Weirzin electrolytically zinc-coated steel is based on two factors: performance in our products and performance in our production lines.

"With Weirzin, of course, our stud systems have the strength, rigidity and high degree of fire resistance inherent in steel. And because Weirzin's zinc coating is completely integrated with the steel, we have the added assurance of a corrosion-free life for our systems.

"In our production lines, Weirzin goes smoothly through every operation—no flaking or peeling regardless of the severity of the fabrication stresses.

"Briefly, we feel that Weirzin has helped us to produce a quality product that gives our customers solid value at low cost."

Strong! Highly resistant to fire! Highly resistant to corrosion! Easy to fabricate! That's Weirzin electrolytically zinc-coated steel. For more information on Weirzin send for free booklet. Write Weirton Steel Company, Dept. A-17, Weirton, West Virginia.

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WEIRTON STEEL COMPANY

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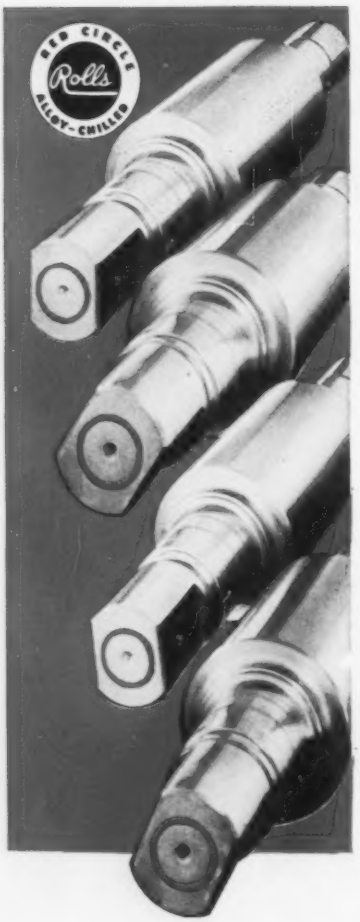

Red Circle Rolls

for all purposes

The Red Circle on the Roll is the Hyde Park mark of Quality. Hyde Park makes rolls for every type mill.

CHILLED ROLLS · ALLOY IRON ROLLS · MOLY ROLLS · NICKEL CHILLED ROLLS · GRAIN ROLLS · COLD ROLLS · SAND ROLLS

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Finer Finish, Longer Life
and Greater Tonnage
specify Red Circle

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland Co., Pa.
ROLLS
ROLLING MILL MACHINERY
GRAY IRON CASTINGS

FREE TECHNICAL LITERATURE

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 99.

Cutoff Wheels

A line of cutoff wheels is available in three bond types: resinoid, rubber, and reinforced resinoid. A booklet includes a table of suggested gradings for cutoff operations. (Cincinnati Milling Machine Co.)
For free copy circle No. 1 on postcard, p. 99

Chemical Milling

The removal of metal by controlled chemical etching is the subject of a 30-page brochure. Data on various methods of metal finishing are also included. (Anadite, Inc.)
For free copy circle No. 2 on postcard, p. 99

Low-Cost Magnesium

Specifications for magnesium-ferrosilicon, a low-cost source for magnesium for ductile iron, are available in a new four-page folder. (Electro Metallurgical Co., Div. Union Carbide Corp.)
For free copy circle No. 3 on postcard, p. 99

Extruded Copper

Design engineers will be interested in a 44-page booklet devoted to extruded shapes in copper, brass and other copper base alloys. Design and cost advantages are covered as well as technical data illustrated through case histories. (Revere Copper and Brass Inc.)
For free copy circle No. 4 on postcard, p. 99

Pure Titanium Data

Typical chemical compositions and mechanical properties are tabled in an eight-page booklet. A full-page chart compares the corrosion resistance of titanium with other metals. (Mallory-Sharon Metals Corp.)
For free copy circle No. 5 on postcard, p. 99

Aluminum Plate

Cast aluminum tooling plate is the subject of a 12-page booklet. Production and cost advantages are discussed. (Red Seal Metals Co.)
For free copy circle No. 6 on postcard, p. 99

Lathes

Heavy-duty geared head lathes in sizes from 48-144 in. are described in a 32-page illustrated bulletin. Specifications for each lathe size are included. (Consolidated Machine Tool Div., Farrel-Birmingham Co., Inc.)
For free copy circle No. 7 on postcard, p. 99

Slings

Sling users should find this 58-page illustrated booklet interesting. It describes many types of slings and sling fittings. Load tables and instructions on use of slings are included. (Broderick & Bascom Rope Co.)
For free copy circle No. 8 on postcard, p. 99

3-Dimensional Unit

Three-dimensional milling and machining at production rates up

to one part every 18 seconds are described in new brochure. Typical parts adaptable to process are shown. (Tri-Ordinate Corp.)
For free copy circle No. 9 on postcard, p. 99

Clad Metal Parts

A new folder describes a line of cellulosic, nylon and polyethylene cladding powders. Included are suggested applications for the various resins and a cladding selection table. (National Polymer Products Corp.)
For free copy circle No. 10 on postcard, p. 99

Drills, Power Drivers

A new line of drills and power drivers has been approved and powered for industrial use. The heavy-duty drills have sealed ball bearings designed for continuous operation with lifetime lubrication. (The Stanley Works)
For free copy circle No. 11 on postcard, p. 99

Alloy Anodes

Alloy anodes for acid copper plating is the subject of a report covering the advantage of a synthesized anode. (The American Brass Co.)
For free copy circle No. 12 on postcard, p. 99

Spray Painting

Spray painting of parts, subassemblies and finished units is covered in an eight-page booklet. Automatic painting of various shapes and sizes is discussed. (Eclipse Air Brush Co.)
For free copy circle No. 13 on postcard, p. 99

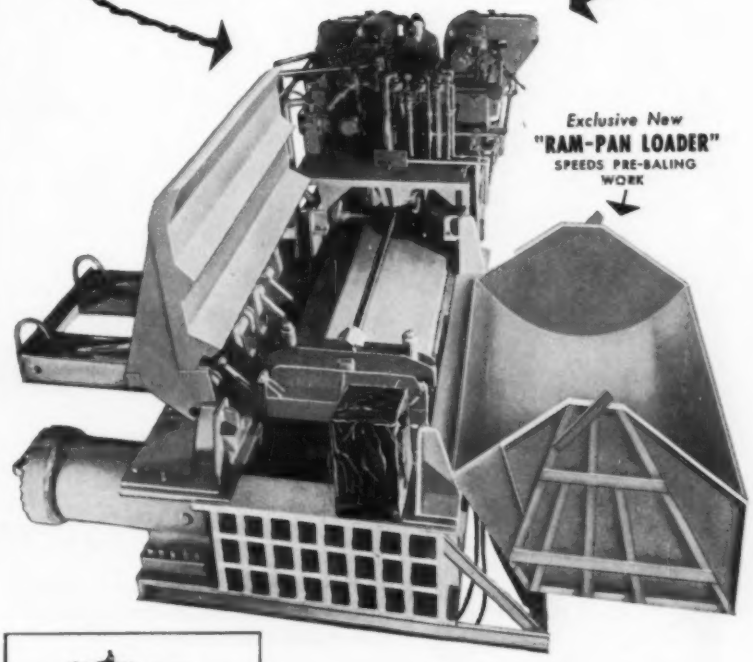
Locknuts

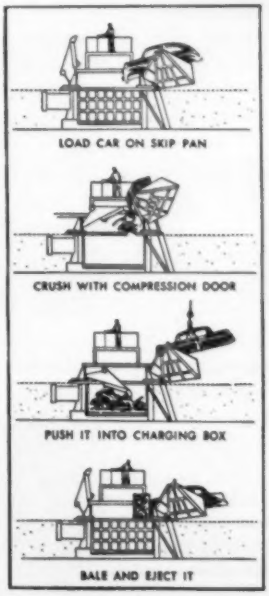
Self-locking nuts for retaining anti-friction bearings on spindles and shafts are described in a four-page bulletin. A locking fiber insert is featured. (Bearing Locknut & Machine Co.)
For free copy circle No. 14 on postcard, p. 99

Steel Framework

Three steps in planning, cutting and joining steel framework are detailed in a 20-page illustrated catalog. Load tables for horizontal and

New Power-Packed "750-CS" ... Bales Car Bodies in Just 3 Minutes!





Low-Investment Balester Does Work of Bigger Presses.

In a feast-or-famine market, versatile equipment pays off! That's the reason for the new 750-CS which handles smaller scrap with unbeatable efficiency and bales car bodies at a pace only slightly off that of the big expensive presses. The powerful new "Ram-Pan Loader" with the curved bottom fits the arc of the compression door as it pushes the car down into the charging box, a pre-baling operation that takes less than a minute and reduces costly cutting or shearing work, all told, you've got a tight compact bale in *less than three minutes!* You'll like the many other new features of the 750-CS; write today for our new bulletin.

Mfd. By Dempster Brothers, Inc.

DEMPSTER BROTHERS, Dept. IA-5A
Knoxville 17, Tenn.

WRITE TODAY
For New Bulletin on the 750-CS
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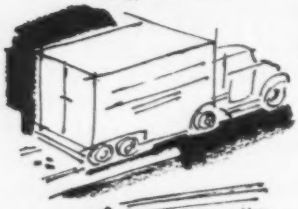
INDUSTRIAL WIRE CLOTH AND SCREEN

Bulk or Fabricated Parts

INQUIRIES ARE ANSWERED PROMPTLY—Whenever you call or write for information on prices, availabilities or service, you get a prompt reply.



DELIVERIES ARE MADE ON TIME—Orders for the most frequently used types of wire cloth are promptly filled. If we can't supply what you want from our complete stock, we'll schedule our looms to get it to you as soon as possible.

INSTALLATIONS ARE CHECKED—At Cambridge, orders aren't filled and forgotten. Our own sales engineers follow up your order to make sure our product is giving you the best possible service.

QUALITY, OF COURSE—Individual loom operation and countless checks on mesh size and mesh count assure you of highest quality wire cloth when you specify Cambridge.

Let us quote on your bulk or fabricated wire cloth needs. Samples for inspection or test purposes are available upon request. Call your Cambridge FIELD ENGINEER. He's listed in the phone book under "Wire Cloth." Or, write direct for FREE 94-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

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OFFICES IN PRINCIPAL INDUSTRIAL CITIES

FREE LITERATURE

upright framework are given. The framing is suitable for catwalks, machine guards and storage racks. (Berger Div., Republic Steel Corp.)
For free copy circle No. 15 on postcard, p. 99

Moulded Parts

Properties of molybdenum disulphide filled nylon parts are given in a four-page booklet. Applications in metal-working, automotive and electrical industries are included. (National Polymer Products, Inc.)
For free copy circle No. 16 on postcard, p. 99

Plastics

Specifications and prices on plastic sheets, rods, film, tubing and special items are given in a 144-page catalog. Technical information, properties and descriptions are included. (Delta Products, Div. Air Accessories Inc.)
For free copy circle No. 17 on postcard, p. 99

Electric Heaters

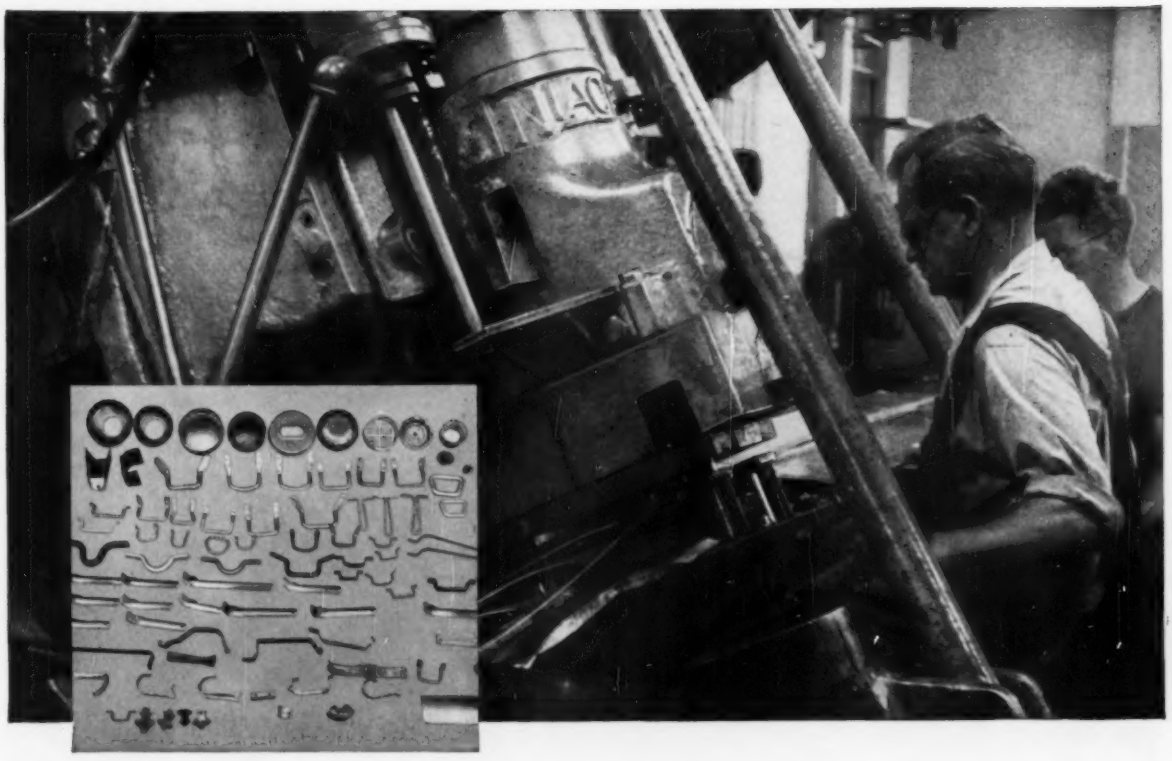
Flat and semi-cylindrical electric heating units have two temperature ranges—1800° and 2200°F maximum. A four-page bulletin gives diagrams, dimensions, wattages and prices. (Hevi-Duty Electric Co.)
For free copy circle No. 18 on postcard, p. 99

Precision Metal Strip

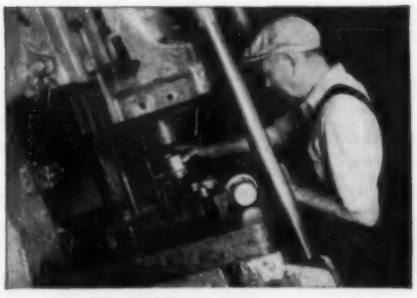
Selection of precision-rolled metal strip for electronics application is discussed in a new pamphlet. A listing of electronic parts and components showing the metals now being used is featured. (American Silver Co.)
For free copy circle No. 19 on postcard, p. 99

Tooling Services

A pocket-size, 76-page directory of special tooling services is available. Full company information, as well as the specific service offered, is given for more than 1000 contract tool and die plants. (National Tool & Die Manufacturers Assn.)
For free copy circle No. 20 on postcard, p. 99



"We stamp them all using just 2 Cities Service Oils!"



Presses shift to numerous operations without ever changing oil, thanks to versatility of the 2 Cities Service oils used for all jobs.

Handles by the thousands are produced by Res for cooking utensils and similar items. Finish is excellent, thanks to Cities Service oil.

...says Res Manufacturing Company Milwaukee, Wisconsin

It's doubtful if anyone makes a more diversified line of stamped and formed metal products than Res Manufacturing Company.

With its 21 presses, ranging from 15 to 200 tons capacity, Res turns out millions of articles a year . . . wire handles, metal handles, wire forms, drawn shells, lifting loops, and parts for electrical controls, to mention just a few.

"All require the best possible finish and all get it with the use of just two Cities Service oils," says Assistant Plant Manager Herbert W. Krueger.

"For drawing, shaping, and punching aluminum, we use Cities Service Chillo #2 with excellent results. Where drawing, swedging or forming of steel and brass is required, we use Cities Service Chillo 12 and get equally fine results.

"Not only do these two Cities Service oils handle all our jobs and produce the best possible finish, but we also find they increase tool life and hold scrap to a minimum. In short, these are the best oils we have ever seen."

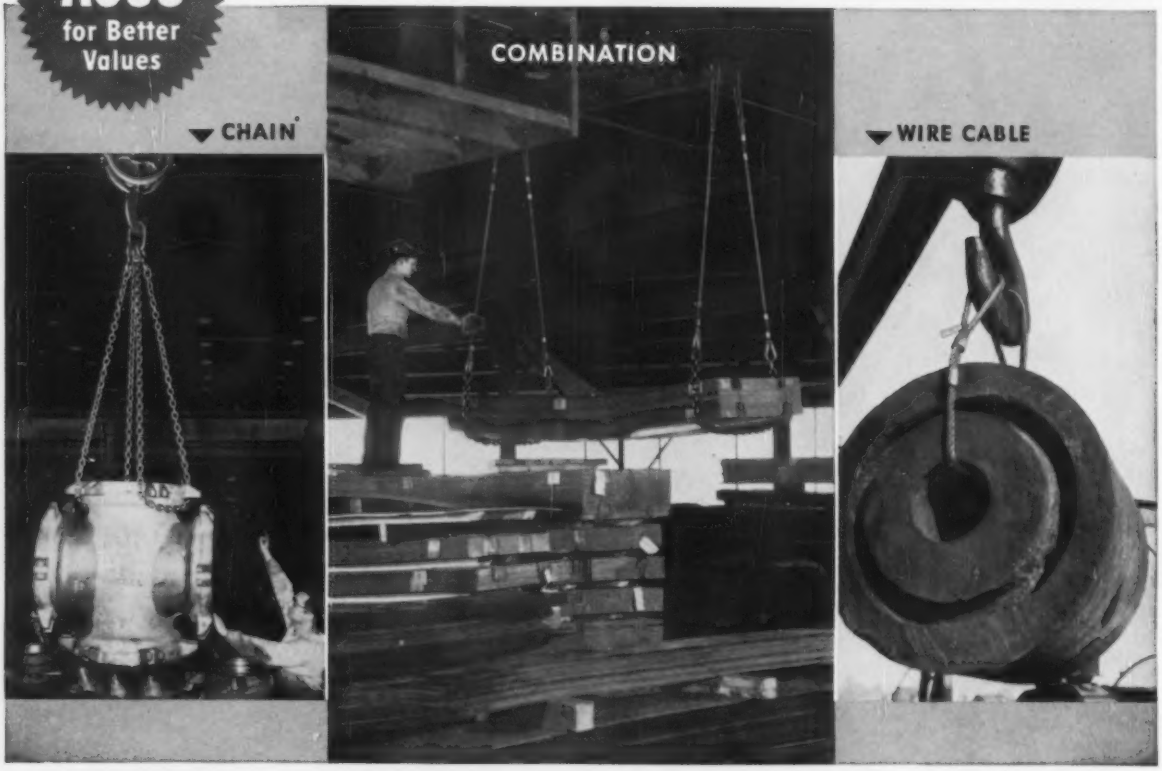
Like Res Manufacturing, chances are your operation can be simplified with the right Cities Service oils. Talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

ACCO for Better Values

Acco Registered® Slings—Chain and Cable



ACCO—your first source for any sling for any job

Whatever your sling requirements, there's an ACCO *Registered* Sling to do your particular lifting job in the safest, most economical way possible. Your rigger knows why certain slings should be used to lift certain types of loads, depending on varying factors of shape, weight, material and finish. Sometimes chain slings are necessary; other times cable; and on certain lifts a combination of chain and cable slings are best.

Because sling work requirements do vary from job to job, make certain that all your slings are precision-made under uniform conditions of quality control and pre-tested before they leave the factory. Only ACCO *Registered* Slings can give you this assurance...in the widest range of sizes and styles from any single source.

In addition, you get the latest technical improvements in ACCO *Registered* Slings. For example, there's the new shaped Master Link now available without extra charge on all ACCO *Registered* Slings. This new link, an exclusive development of ACCO engineers, gives 18% greater resistance to distortion with no increase in weight. Just one more quality bonus you get from ACCO *Registered* Slings.

Each of these slings is factory proof-tested at a load of no less than twice its rated capacity. Only after a sling has passed this rigorous test is it given the ACCO tag and certificate of registration.

Tell your distributor you prefer ACCO *Registered* Slings.

WHAT "ACCO REGISTERED" MEANS

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring or tag on each sling
6. Signed Registry Certificate with each sling

AMERICAN CHAIN & CABLE
BRIDGEPORT, CONN.

ACCO

Atlanta, Boston, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Wilkes-Barre, Pa., York, Pa.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Springs, Wire Forms

A spring for every purpose, no matter how small or large, is the subject of a folder. Also covered are wire forms and stampings. (The Han-Dee Spring & Mfg. Co.)

For free copy circle No. 21 on postcard

Electronic Control

A folder describes how an automatic control system for table positioning enables one drill press to do the work of five. (Stromberg-Carlson, Div. General Dynamics Corp.)

For free copy circle No. 22 on postcard

Barrel Finishing

Separating, handling and storage equipment for use with several models of barrel finishing units is the subject of a catalog page. (Speed-D-Burr Corp.)

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Radial Drill

In addition to being a radial drill, the unit functions as a deep-throat production turret drill. A six-page foldout covers specifications on speed control and selection of spindles. (Burg Tool Mfg. Co., Inc.)

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Hydraulic Drives

Application of hydraulic power in solving production problems is covered in a leaflet illustrated with a case history. (The Oilgear Co.)

For free copy circle No. 25 on postcard

Form Internal Threads

A detailed bulletin tells how a new line of taps forms internal threads without cutting in copper, brass, zinc, lead, leaded steels and other ductile materials. (Besly-Welles Corp.)

For free copy circle No. 26 on postcard

Welding Fittings

A four-page folder gives suggestions for ordering welding fittings and flanges to facilitate processing orders by the supplier. (The Babcock & Wilcox Co.)

For free copy circle No. 27 on postcard

Induction Heating

Rental of induction heating equipment is described in a four-page brochure. Details of various lease plans for small or large companies are given. (Induction Heating Corp.)

For free copy circle No. 28 on postcard

Self-Locking Screws

Socket screws, self locking by means of a nylon pellet in the threads, are described in a four-page bulletin. Sizes, hardness and types are outlined. (Cleveland Cap Screw Co.)

For free copy circle No. 29 on postcard

Speed Control

Typical installations for controlled automatic variable speed systems are outlined in an eight-page illustrated booklet. Systems apply to basic handling processes, such as mixing, filtering, and conveying. (U. S. Electrical Motors, Inc.)

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Numerical Control

Numerical control either by punched cards or tape as applied to its line of jig borers and grinders is described in a makers bulletin. (The Fosdick Machine Tool Co.)

For free copy circle No. 31 on postcard

Furnace Control System

A series of data sheets describe a current adjusting control system that will continuously regulate power input to electric furnaces,

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **5/1/58**

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FREE LITERATURE

either continuous or batch type. Specifications for individual components of the system are also given. (Leeds & Northrup Co.)

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Presses

Two point, straight side, double-geared presses in capacities from 150-500 tons are described in an eight-page bulletin. A combination air friction clutch and brake on the intermediate shaft is featured. (The Minster Machine Co.)

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Insert Tool Holders

Tool holders, clamp screws solid carbide shims, carbide chip breakers, carbide inserts and clamps are all covered in a new eight-page catalog. (Metals Carbides Corp.)

For free copy circle No. 34 on postcard

Aluminum Mill Products

Data on aluminum characteristics, fabrication and finishing techniques, mechanical and physical properties of alloys, and services are listed in a new publication. (Kaiser Aluminum & Chemical Sales, Inc.)

For free copy circle No. 35 on postcard

Punches, Die Buttons

Shoulder-type and interchangeable ball seat punches, ball seat and press-fit die buttons are covered in a new catalog. (Pivot Punch & Die Corp.)

For free copy circle No. 36 on postcard

Tractors

Versatility and economy of a line of tractors is the theme of a new publication illustrated with job applications. (Caterpillar Tractor Co.)

For free copy circle No. 37 on postcard

Precision Machining

A contract manufacturer presents the firm's experience in machining precision parts for missiles, rockets and jet engines in a 16-page booklet. (American Non-Gran Bronze Co.)

For free copy circle No. 38 on postcard

Punch Card Reader

An illustrated two color data sheet describes a new punch card reader for automatic control of blending, batching and proportioning operations. It's designed for use with electronic proportioning systems set up on punched cards. (Richardson Scale Co.)

For free copy circle No. 39 on postcard

Refractory Coatings

Details of a system and method for maintenance of refractory linings in heat treating furnaces and other types by protective coatings are described in a bulletin. (Saverite Engineering Co.)

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Jigs and Fixtures

Increase in the size of a basic unit of a universal tooling system is outlined in a new bulletin. Special elements have also been added. (Wharton Unitools)

For free copy circle No. 41 on postcard

Testing Fixtures

Illustrated literature describes gripping fixtures for a makers line of universal testing machines. The grips permit testing a wide variety of material in tension, compression or shear. (W. C. Dillon & Co.)

For free copy circle No. 42 on postcard

Metering System

Design and operation of metering and control systems are described in a four-page bulletin. Pneumatic and electric telemetering is discussed. (Bailey Meter Co.)

For free copy circle No. 43 on postcard

Face Mill Cutters

A line of face mill cutters for throw-away inserts is the subject of a bulletin which lists rake designs and styles. (Vascoloy-Ramet Corp.)

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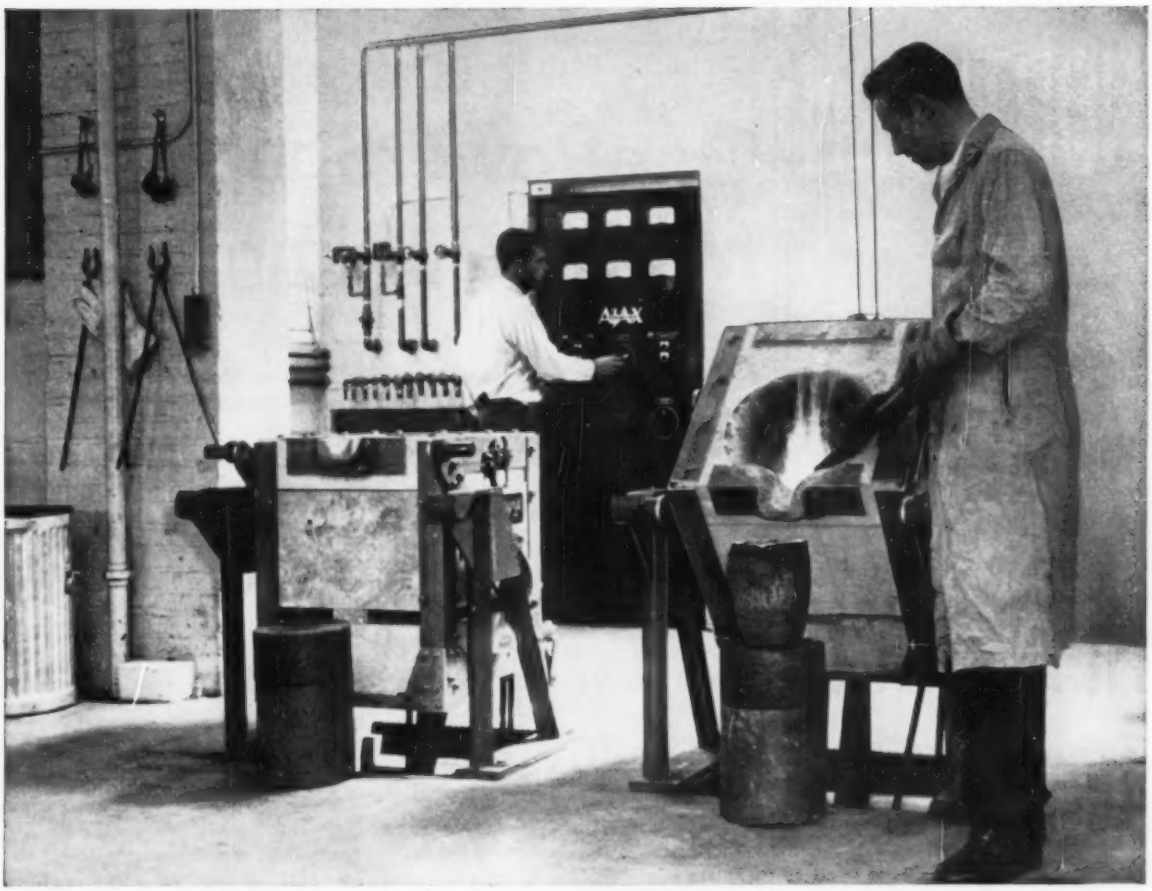

HIGH FREQUENCY INDUCTION HEAT IN THE LABORATORY

For the laboratory metallurgist, the moment of truth is in the melting furnace. More likely than not, the crucible he turns to is set in the helix of an Ajax-Northrup induction coil. For ever since its discovery, high frequency induction heat has been instrumental in the birth of new metals.

The *clean* heat of the induction furnace has ushered in alloys unmarred by impurities . . . has permitted the successful development of vacuum metallurgy. Its precise control of heat permits alloying as the metallurgist desires —no longer at the mercy of chance. And the stirring action inherent in Ajax-Northrup induction melting has actually made possible many new metals and alloys.

There you have just a few of the advantages that make Ajax-Northrup furnaces a laboratory standby. Even in this day of computers, spectrographs, and electron microscopes, they are assured an important place in the search for the unknown . . . the study of the known.

Available in capacities from a few pounds to several thousand pounds, Ajax-Northrup furnaces may be powered by economical converters or heavy duty motor generator sets. Write for Catalog.
Ajax Electrothermic Corp., Ajax Park, Trenton 5, New Jersey.

Induction heating & melting
AJAX
NORTHRUP

ASSOCIATED COMPANIES: AJAX ELECTRIC COMPANY-AJAX ENGINEERING CORPORATION

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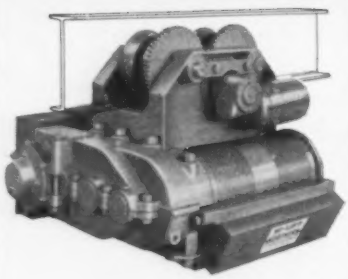

HEAVY DUTY
HI-LIFT HOISTS
with
TROLLEY DRIVE

Northern Hi-Lift Hoists, in all models from two through 15 tons capacity, with all their heavy duty, rugged features, including the same low headroom, are now available with a new, inexpensive trolley drive designed for moderate speeds, and for single or variable speed control. A worm drive provides smooth, quiet and trouble-free operation. Compact design and arrangement allow maximum approaches with minimum space requirement.

These two-motor hoists are available for A.C. or D.C. current, and are built with standard or fluid coupling drives. Write for further details to:

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

NORTHERN HOISTS

EH-3555

One Power Source Fits Many Welding Units

When each of many welding units requires its own power source, there's multiplication of equipment.

A new power unit eliminates duplication of equipment by serving multiple arc-welders.

▪ A new concept in multi-arc welding from a single power source system makes use of 750- to 1500-amp dc constant-potential power units in conjunction with series resistance grids. These accommodate arc welding, tack welding, stud welding, arc air gouging and inert arc welding.

This single source unit feeds power to different type welders.

Designed to replace or augment either existing motor-generator sets or single-operator welding machines, the unique system is suitable not only in such field construction work as shipbuilding and erection of buildings and bridges, but also in manufacturing plants where general steel fabricating is performed under normal duty cycles.

Depends On Use — Depending upon a particular application, the 1500-amp set, produced by Welding Products Div., A. O. Smith Corp., Milwaukee, can be used where 15 to 40 arcs are required. In turn, the 750-amp A. O. Smith unit accommodates about half the number of arcs of the 1500-amp type, again depending upon the application. Arc time, duty cycle and normal diversity of manual welding operations contribute to the determination of the number of arcs that can be used.

The units offer several advantages: They occupy considerably less space than a group of single-operator welding sets. In addition, they enable the welding operator to adjust his heat from his work position no matter how distant by locating the series grid near the work.

Cut Lead Worries—The units reduce by at least 80 pct the primary power connection and welding lead problem, says the manufacturer. And they're said to provide excellent welding characteristics.

The new concept allows operation of many arcs from single power unit. It also has ability to power a number of stud welders or drive extremely large studs.

Why This Source?—The 1500-

Want More Data?

You may secure additional information on any item briefed in this section by using the reply card on page 99. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

amp set was originally developed through a contract received from the U. S. Navy Bureau of Ships for a direct-current power source to supply a multiplicity of arcs through series resistance grids. The Navy had this problem: Many of their repair and dock facilities had constant-potential motor-generator sets designed for this type welding; the sets were becoming old; service parts were not readily available.

The Navy had many of these constant-potential sets installed. As a result it required a replacement unit to fit the same space—and save some space if possible.

Fills The Bill—The A. O. Smith model satisfied these and many more requirements. Prototype units have been operating satisfactorily for the Bureau of Ships; they have been subjected to every conceivable type of use. Because they are intended to duplicate the performance of existing CP sets, they will replace or duplicate existing installations.

The same problem originally faced by the Navy is also being faced by many companies in the broad steel fabricating field. Of particular interest to these companies is the fact that if the new power sources are purchased to replace motor-generator sets, existing wiring systems can be used; in turn, installation costs are kept at a minimum. Welding operators do not need to learn any new techniques, but continue to weld as before.

Machining

Cemented oxide applies to gun drill tooling

An evaluation project has pointed up the practicality of using cemented oxides on gun drills. Design engineers at Hyper Tool Co., Detroit, and Metallurgical Products Dept., General Electric Co., Detroit, worked together in designing the drills.

A standard socket screw in a counterbored hole in the oxide holds the cutting tip in place. The oxide

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These are in the Duraloy HT group calling for Ni 33.37 percent. We've gone as high as 68% nickel on some castings where extremely high temperatures and very severe corrosive conditions had to be resisted. The important factor concerning castings for exceptionally high temperatures is that they must retain their structural form under load.

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Knowing just how much nickel to put in and how much chromium and other alloying elements depends to a large extent on experience . . . and it is experience that we can offer you for the castings you need. We've been producing static castings since 1922 and centrifugal castings since 1933, being among the pioneer founders in each class.

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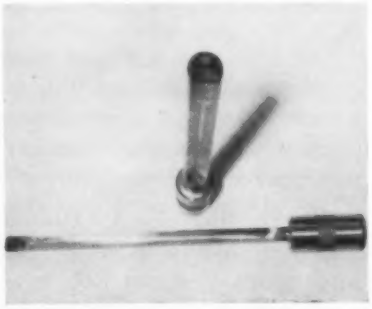
TECHNICAL BRIEFS

fits in a 60° tuncated V-notch.

Double Flow of Oil—Two oil holes rather than one insure that chips will be rapidly removed from the cutting edge. The drills have been made in two sizes: 0.625 and 1.00 in. diam. The tolerance on



Fast chip movement is a key feature of these gundrills.

the cemented oxide diameter of the drill was held to within ±0.000 and —0.0002 in.

Next phase in the development program will evaluate the performance of cemented oxides in comparison to conventional gun drilling materials.

Metal Finishing

Adjustable plastic hoods exhaust acid fumes

A chemical treatment applied to steel wire by a mill demands highly

Steel wire gets special treatment under these unique hoods.

corrosive acids. Preventing the fumes from entering the building presented a problem.

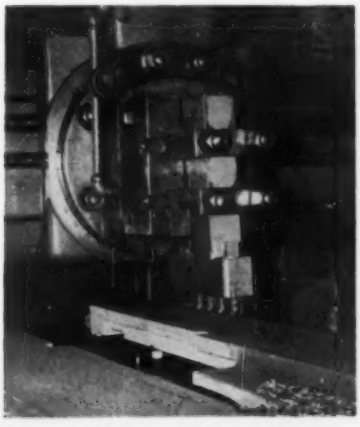
Existing structures ruled out continuous hoods. The answer came in fabricating individual stacking covers of an unplasticized polyvinyl chloride material made by Kaykor Industries, Yardville, N. J. The individually removable covers can be placed around obstructions.

Machining

Special toolholder more than doubles planer's output

Thanks to a special toolholder, a maker of cast iron saw table tops more than doubles its output. The four-gang planer toolholder for carbide throwaway tools lets the machine rough plane five 31 x 80-in. tops in the time formerly necessary to plane two.

The toolholder, designed at the G. M. Diehl Machine Works, Wabash, Ind., holds four tools. These have square inserts made by



Four cutters on this holder assure bigger and better bites.

Kennametal, Inc., Latrobe, Pa. Tools are offset from each other by 0.055 in.

Planes Rapidly—The planer runs at 0.200 in. feed per stroke, 100 sfpm, and ¼ in. depth of cut per pass. It removes about 5/8 in. of stock from each table top.

Each of the eight cutting edges of each insert planes one table top; thus, a considerable time saving results.

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Specify Cowles—world's largest manufacturer of rotary knives—to get more tonnage per grind, and cut production costs. Our exceedingly high standards of precision manufacture and exacting heat treatment assure utmost accuracy, efficiency and long life. Complete line including slitting, trimming and specially engineered knives, in our **Max-cut; Specialloy; Superalloy; Circle C** and **Super C** grades—also carbide knives — for any requirement. Prompt delivery. Engineering help on any job. **Let Cowles quote on your requirements.**

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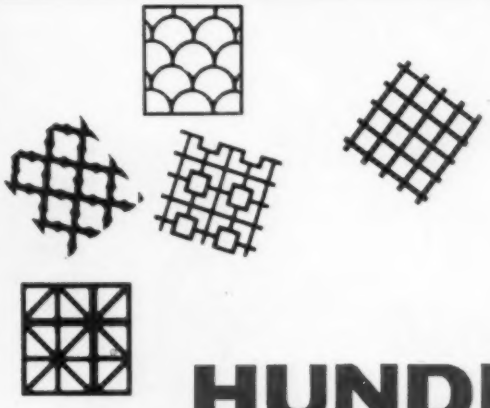

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Brazing Sheet Follows Contoured Surfaces

As honeycomb construction finds widening uses, brazing techniques have to keep pace.

Here's where brazing sheets adapt to processing of contoured panels.

▪ Development of a thin, flexible sheet has resulted in a material suited for manufacture of brazed honeycomb structures slated for high temperature service. Being flexible, the sheet adapts readily to contoured surfaces.

Laboratory tests and pilot production indicate that the material exhibits flow and wetting properties equal to those of conventional brazing alloy forms. The new brazing sheet, produced by Stainless Processing Div., Wall Colmonoy Corp., Detroit, comes in two sizes (0.005 or 0.010 in.) for use with stainless grades, high alloys and titanium.

Wide Choice of Alloy — Sheet thickness of 0.005 in. (+0.002 to —0.001 in.) is available in L.M. Nicrobraz, Nicrobraz 10, Nicrobraz 45, Nicrobraz 50, Nicrobraz 60, Nicrobraz 130 and Nicrobraz 150 brazing alloys. The 0.010-in. sheet is available in all the above alloys, plus standard Nicrobraz, L.C. Nicrobraz and Nicrobraz 30.

One pound of 0.005-in. sheet will

Worker's nylon gloves prevent contamination of thin sheet.

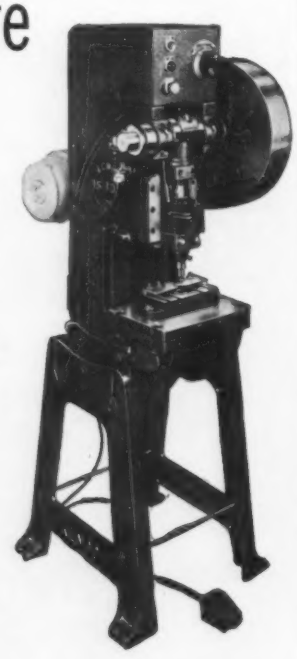
cover about an 18½ sq ft area. The 0.010-in. shim will cover about 9 sq ft.

Widths up to 1 ft are available in lengths up to 6 ft, and widths from 1 to 2 ft are available in lengths to 2 ft.

In assembling the honeycomb, white nylon gloves are worn to protect the thin sheet from contamination by skin oils.

KENCO

15-ton Electro-Safe
the safest
punch press
you can buy!



Single-trip control buttons are widely spaced, to keep hands clear of the danger zone. Operators must push *both* buttons at once... hold them until stroke reaches bottom, then release both buttons to start new cycle. Fail-safe operation. Impossible to "fudge." Impossible for press to double trip.

Versatile controls—You can change from "single trip" to "continuous stroke," or "inching" by merely turning a dial. You can change timing in seconds. No flywheel... no clutching. Write for details.

KENCO MANUFACTURING CO. *5211 Telegraph Road, Los Angeles 22, Calif.*

Maintenance

Plastic compound makes emergency repairs rapidly

A newly announced epoxy-based compound makes emergency repairs to metal, plastic, wood or concrete.

Using the material, metal pipes can be repaired quickly, easily.

The compound allows equipment to be back in service within an hour after repair.

Developed by the Homalite

Corp., Wilmington, Del., it repairs leaky pipes, broken castings, or corroded sheet metal. It effectively seals against pressure or vacuum, and is stable up to 150°F.

To make a repair, the surface should be clean and dry. A coating of compound is applied. Over this goes a layer of glass cloth and another compound coat. For extra strength added layers of glass cloth and compound may be applied.

The maker states that the material has been used as a liner for tanks and ducts handling corrosive fluids. Its dielectric properties suit it to sealing and repairing electrical equipment.

Fabricating

Titanium forging withstands corrosion under pressure.

Cost per service year is vital in selecting a material for corrosive use. But here's one case where the selection of titanium not only proved valid in terms of service, but also turned out to be lower in initial cost than other metals.

Many Metals Fail—The problem was the fabrication of working barrels for recycling pumps to handle corrosive fluids under high pressures at high velocities. Even Type 316 stainless steel barrels cracked from corrosion fatigue. Lead and silver linings were tried and discarded.

A forged chrome-nickel-molybdenum barrel at one time appeared to be satisfactory, but porosity in the alloy was uncovered by erosion.

The pump manufacturer, Aldrich Pump Co., Allentown, Pa., decided to try a titanium forging. The newly formed Titanium Div., Crucible Steel Co. of America, Pittsburgh, supplied Type A-55 titanium.

Check Corrosion — After 6-month's service, the barrel was examined and no measurable corrosion could be found. In fact the original machining marks were still visible.

Another advantage is reduction in weight.

T-J spacemaker cylinder

Quality Engineered

to give quality results

with Extras . . .
at No Extra Cost!

You get more—much more—when you specify and use any of T-J's complete line of Spacemaker cylinders. The Spacemaker is engineered to give you better, more accurate, and longer service—offers, exclusively, many extras . . . that are STANDARD, AT NO EXTRA COST!

Designed to eliminate tie-rods, providing greater strength . . . saves space . . . reduces manhours and costs in all push-pull-lift operations. OFF SHELF DELIVERY in a wide range of styles and capacities, with 64,000 combinations. Write for catalog SM 56-2 with complete engineering details. The Tomkins-Johnson Co., Jackson, Mich.

T-J TOMKINS-JOHNSON
RIVETORS, AIR AND HYDRAULIC CYLINDERS, CUTTERS, CLINCHORS

METAL PISTON ROD SCRAPER . . . Standard at No Extra Cost!

NEW "SUPER" CUSHION FOR AIR . . . Standard at No Extra Cost!

CHROME PLATED CYLINDER BORES AND PISTON RODS . . . Standard at No Extra Cost!

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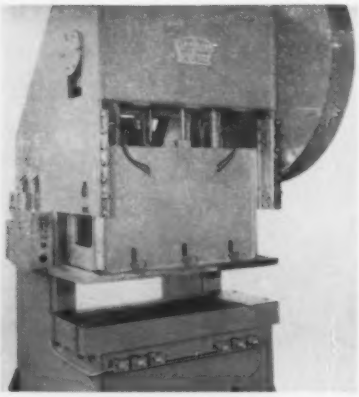
NO TIE-RODS TO STRETCH . . . Standard at No Extra Cost!

STREAMLINED DESIGN . . . Oil Pressure to 750 P.S.I.—air to 200 P.S.I. Standard at No Extra Cost!

FORGED SOLID STEEL HEADS . . . Standard at No Extra Cost!

New Production Ideas

Equipment, Methods and Services



Open-Back Press Features Enclosed Drive

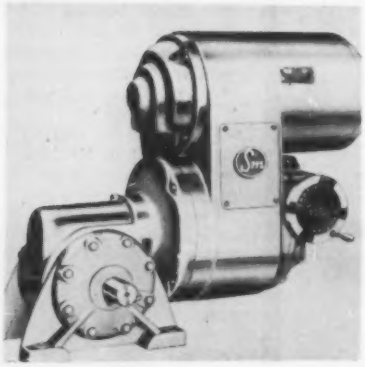
Designed for automatic feeds and greater convenience in handling large or irregular sheets, a new double-crank open-back gap press of welded steel construction is electrically controlled. Single geared, the new 150-ton press has all gears and drive mechanism enclosed with the added safety device of an auxiliary air brake on the flywheel to insure a quick stop. The air-counterbalanced slide is provided with power adjustment. The stroke is 10 in. with 5-in. adjustment. Shut height is 22 in. Both bed and slide have an area of 28 x 72 in. By modifying various dimensions such as stroke, slide adjustment, bed and slide areas, the press can punch, shear, perforate, bend, and form metal from light sheet to heavy plate. (The Cleveland Punch & Shear Works Co.)

For more data circle No. 45 on postcard, p. 99

General Purpose Miller Suits Toolrooms

Featuring a new spindle head, this small, general purpose milling machine for tool and die shops has been added to a builder's line. The head is heavier than earlier models and is driven by a 1½-hp motor. A standard taper hole in the spindle permits using existing taper shank cutters and collets. Cutter changing is eased through a built-in bolt with a locking device. To tighten the arbor shank, the operator rotates the spindle with the speed lever in neutral. An interlock prevents starting while the bolt is locked. Manual feed has both lever and fine handwheel controls. Power feed is available with three feed rates. Spindle speeds vary from 100 to 3800 rpm. Power is transmitted by a belt on variable pitch sheaves. A brake stops the spindle in a few revolutions. Attachments include index head, shaping unit, and measuring equipment. (Cincinnati Milling Machine Co.)

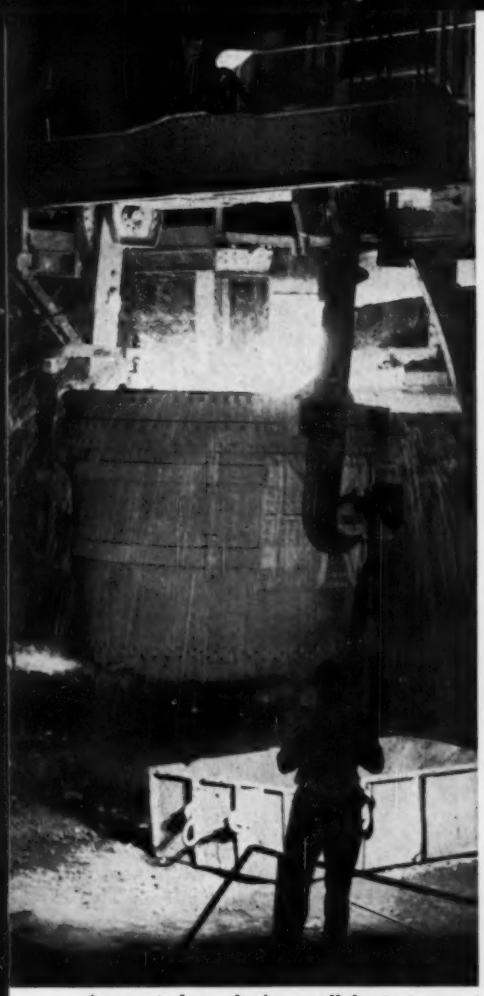
For more data circle No. 46 on postcard, p. 99



Variable Speed Motor Has Right Angle Drive

A variable speed motor drive combines with a right angle gear reducer. This permits application where the output shaft must be at right angles to the transmission. The speed control motor has a positive pulley construction that gives variable speed control. Both the output and input shafts of the reducer are equipped with oil seals that permit operation in any position without oil leakage. The motors used with the reducer come in drip-proof or totally-enclosed construction. Speeds range from 360 to 5½ rpm. Speed variations from 2:1 to 10:1 are possible. The units can be modified, both mechanically and electrically, to suit specific requirements. (Sterling Electric Motors, Inc.)

For more data circle No. 47 on postcard, p. 99



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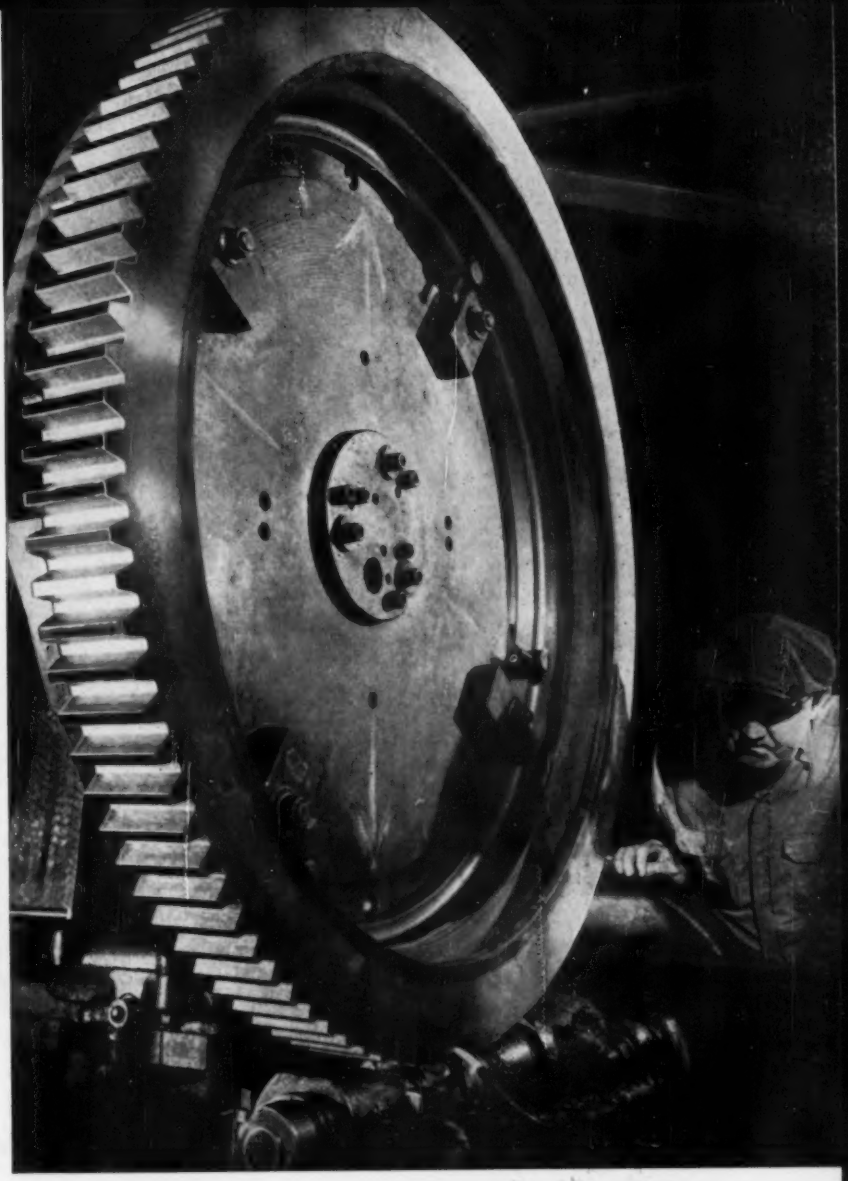
ALCO's *regular forgings offer many opportunities for cost reduction in machine set-up and tooling.*



HOW ALCO FORGINGS HELP LOWER COSTS

Forgings from ALCO are controlled during every step of production to assure uniformity and conformance to your specifications.

In either regular or Hi-Qua-Led® grades in any AISI specification, or in stainless steel, ALCO circular and open-die forgings offer you unique advantages. They can lower your costs in machine set-up and tooling, because you are able to standardize procedures and set machining speeds for the best overall economy. Yet this extra opportunity for profit is obtained with no additional expense.

ALCO's forged and rolled circular forgings range from 18 to 145 in. OD; open-die forgings from 500 to 30,000 lb and 40 ft in length; mandrelled ring forgings to approximately 60 in. wide.

Your inquiries will receive prompt processing. For more information, contact your nearest ALCO sales office, or write ALCO Products, Inc., Department 157, Schenectady, New York.

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NEW YORK

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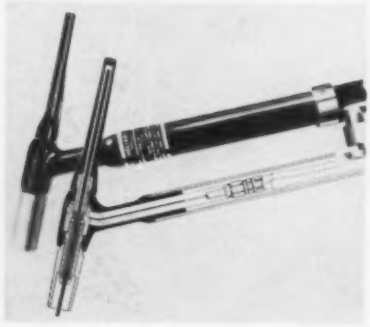
Dial Feed Permits Rapid Indexing

A dial-index feed recently announced permits indexing at 280 strokes per minute. The total table height is less than previous models. Table diameters of 12 or 15 in. with either 10 or 12 stations are standard. A 6½-in. gear, vee-notched on its periphery, controls the indexing. Spring loaded pawls engage the notches. The pawl shape compensates for wear to give accurate repeat to the indexing motion. All steel working parts are heat treated. The table and linkage pivot are ball bearing mounted. Two stationary supports are mounted in the base under the table on each side of the die area. A machined boss between these gives room for tooling or more support. With 12 stations, the table stops for 220° of crankshaft rotation, giving time for the punch to engage and withdraw before moving to the next station. Two stationary supports are provided in the base under the table on each side of the die area. A machined boss between these provides mounting area for additional support. (Benchmaster Mfg. Co.)

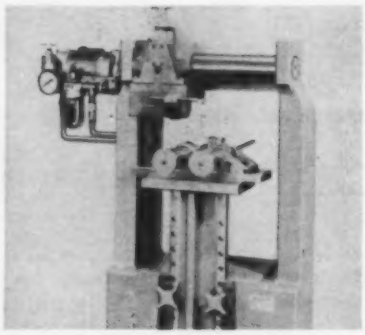
For more data circle No. 48 on postcard, p. 99



Hand Welding Torch Features Cooling Passages

Cooling water passes through passages molded in the torch head. The torch body is made of Fiberglas-reinforced phenolic. New gas cups for the torch have improved thermal shock and heat resistance. The design of the collect bodies gives efficient argon shielding. Optional shut-off valve on handle also conserves gas, besides saving steps and increasing efficiency. The unit may be used with high-frequency stabilized alternating current or straight-polarity direct current welding power at currents up to 300 amps. (Linde Co., Div. of Union Carbide Corp.)

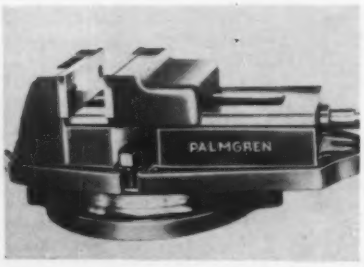
For more data circle No. 49 on postcard, p. 99



Floor-Type Marking Machine Uses Plant Air Line

An open back and offset front permit a marking machine to mark continuous strip, rod and bars. The new floor-type unit derives its operating power from a plant air line and readily fits into any production line. Mouth opening is 14 in. without fixtures and adjustment is every 2 in. Width of opening is 15 in. When the products to be marked are cylindrical in shape, a standard cradle-roll fixture is used. For marking flat parts, a roller die does the job. The marking head can hold an automatic numbering head and a solid marking die for marking both consecutive numbering and company name. (The Acromark Co.)

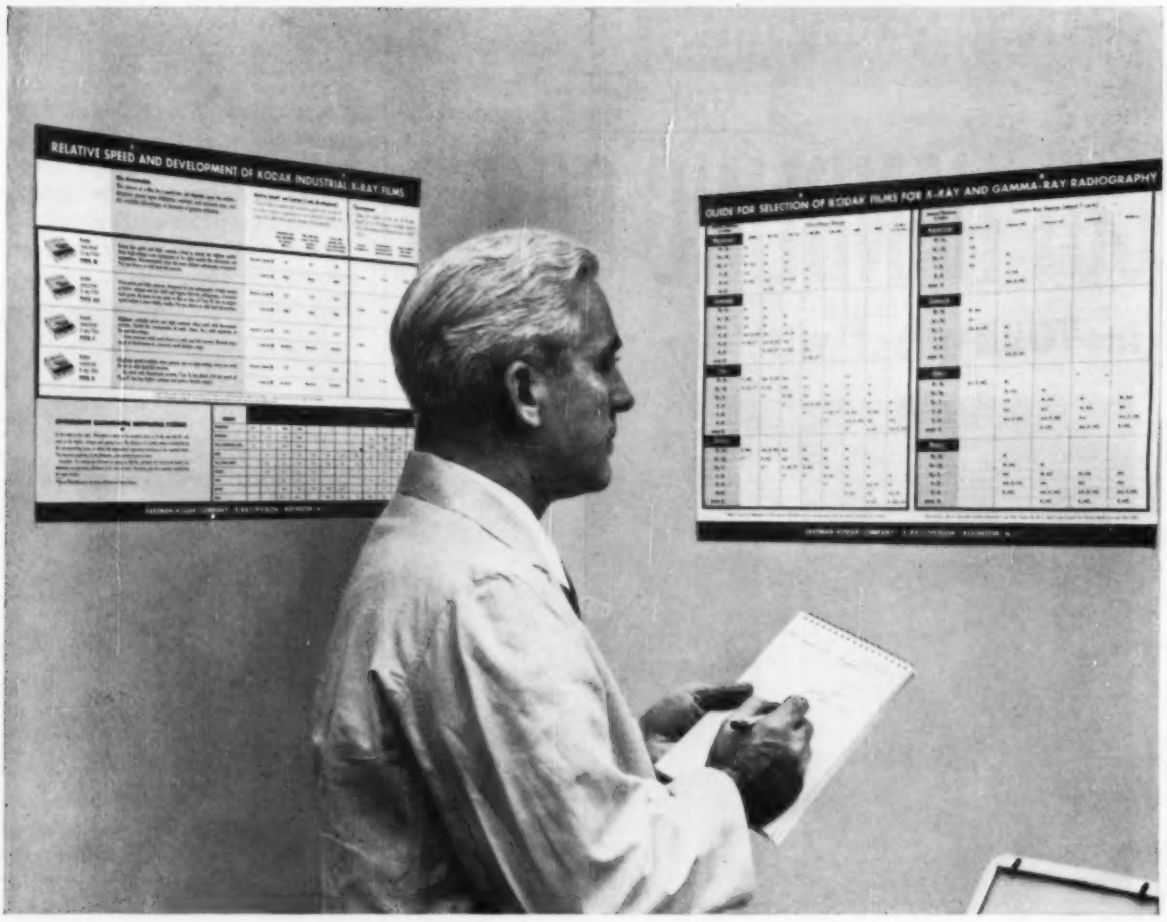
For more data circle No. 50 on postcard, p. 99



Milling Machine Vise Stands Heavy Service

A flanged milling machine vise is precision built for heavy-duty service on milling machines, shapers, planers, drill presses, radial drills, and grinders. The unit may be used with or without its 360°-graduated swivel base. The 8-in. wide jaws open 8 in. with a jaw depth of 2½ in. The ground steel jaw plates are removable and the adjusting screw is equipped with a removable bushing. (Chicago Tool and Engineering Co.)

For more data circle No. 51 on postcard, p. 99


RELATIVE SPEED AND DEVELOPMENT OF KODAK INDUSTRIAL X-RAY FILMS
GUIDE FOR SELECTION OF KODAK FILMS FOR X-RAY AND GAMMA-RAY RADIOGRAPHY

Important Radiographic data at a glance

Free Wall Charts give you latest information on film selection, relative speed, and contrast.

TODAY's fast films and varied radiation sources give the present-day radiographer many new opportunities for establishing exposure factors to meet unusual conditions and get better radiographs.

So that you can have the latest information right before you, Kodak has prepared two quick-reference wall charts—one, a guide for selecting the best type film for your x-ray and gamma ray work—the other, showing relative speed, contrast, and development of Kodak Industrial X-ray Films.

These charts are yours—free for the asking. Just drop us a line and you'll get yours by return mail.

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y

Gentlemen: Please send me your free wall charts of Radiographic data. 22-5

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Kodak

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HOISTS

CUT HANDLING COSTS

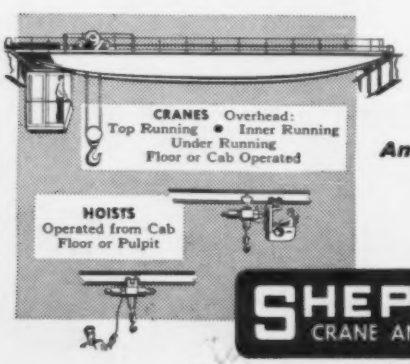
in YOUR plant with the right hoist

FLOOR-OPERATED HOIST
Operator primarily occupied with other duties, uses hoist for fast, efficient short hauls.

CAB-OPERATED HOIST
Cab operator moves loads at high speeds, can quickly spot material for handling.

WHICH Shepard Niles hoist fits your plant's needs . . . a floor-operated hoist where the operator is freed for other duties or a cab-operated hoist where the operator is engaged full time moving loads through the air? Shepard Niles manufactures both types in capacities from 1 to 20 tons.

Send for the descriptive bulletins on both Cab and Floor Operated Hoists . . . or ask that a Shepard Niles representative call — there's NO OBLIGATION.



Building
America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION
1495 Schuyler Ave., Montour Falls, N. Y.

Contour Projector

Available with a choice of interchangeable work tables to meet individual needs, this projector allows gaging anywhere on the screen. With a fixed table and special fixtures it performs production and receiving inspection jobs. An adjustable chart holder permits "set lines" on an overlay chart to coincide with the "set surface" of the fixture. This eliminates need for table movement. (Eastman Kodak Co.)

For more data circle No. 52 on postcard, p. 99

Vacuum Gage

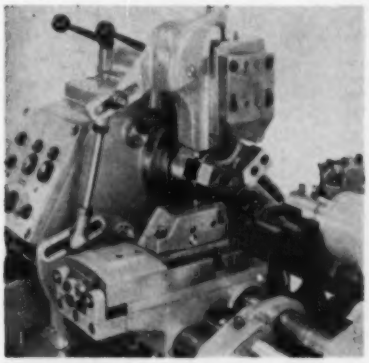
A new thermocouple vacuum gage measures total pressure in a vacuum system on a single scale. The non-linear scale reads from 0 to 1000 microns mercury. The lowest indicated division is 5 microns. Calibration is made without using a reference gage. The unit also serves as a leak detector throughout its range. Low heater current slows

the rate of decomposition of the vapor within the sensing tube to reduce zero drift of the instrument. One or two sensing tubes can be used with the gage to give either single or two station operation. (Consolidated Electrodynamics Corp.)

For more data circle No. 53 on postcard, p. 99

Single-Spindle Chucker

Recommended for secondary operations such as turning, facing, boring or forming, a chucker features an air chuck with a capacity

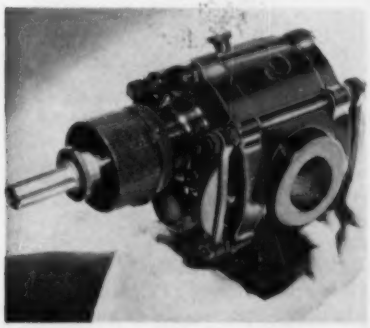


of over 5 in. Its maximum turning length is 5½ in. The spindle brake has an electro-magnetic clutch. Chips fall into the base where they are accessible for removal. (Guthery Machine Tool Corp.)

For more data circle No. 54 on postcard, p. 99

Rubber Gear Pump

Acids, alkalies and other corrosives are pumped with this unit. It features hard-rubber casing and



gears and a rubber covered shaft. This low volume, positive displacement unit delivers 12 gpm. Maximum head is 120 ft. Discharge is continuous, positive and in proportion to speed. A standard ½-hp motor is directly connected to the shaft. Both suction and discharge connections are tapped for 1-in. standard pipe. (American Hard Rubber Co.)

For more data circle No. 55 on postcard, p. 99

Oxygen Cutting Unit

An electric eye guiding on line drawing templates controls torch

travel in a new oxygen cutting unit. The carriage carrying the template moves forward with the cutting unit to position the torches over uncut areas of steel plate when repetitive cutting is done. Central gas controls, combined with convenient start-stop switches, give the operator complete control of all sequences of oxygen cutting within reaching distance of his normal working area. The unit features cast iron track, precision machined cross arm and three-way torch holders. The electric-eye circuit uses five tubes and can be readily adjusted and serviced. Multiple torch operation is handled by the unit without loss of accuracy. (American Messer Corp.)

For more data circle No. 56 on postcard, p. 99

Drill Press

Power feed is a key feature of this new magnetic-base drill press. Capable of drilling holes to 1¾ in., the unit operates in any position. Both air operated and electric portable drills can be adapted to fit the drill press. (Buck Mfg. Co.)

For more data circle No. 57 on postcard, p. 99

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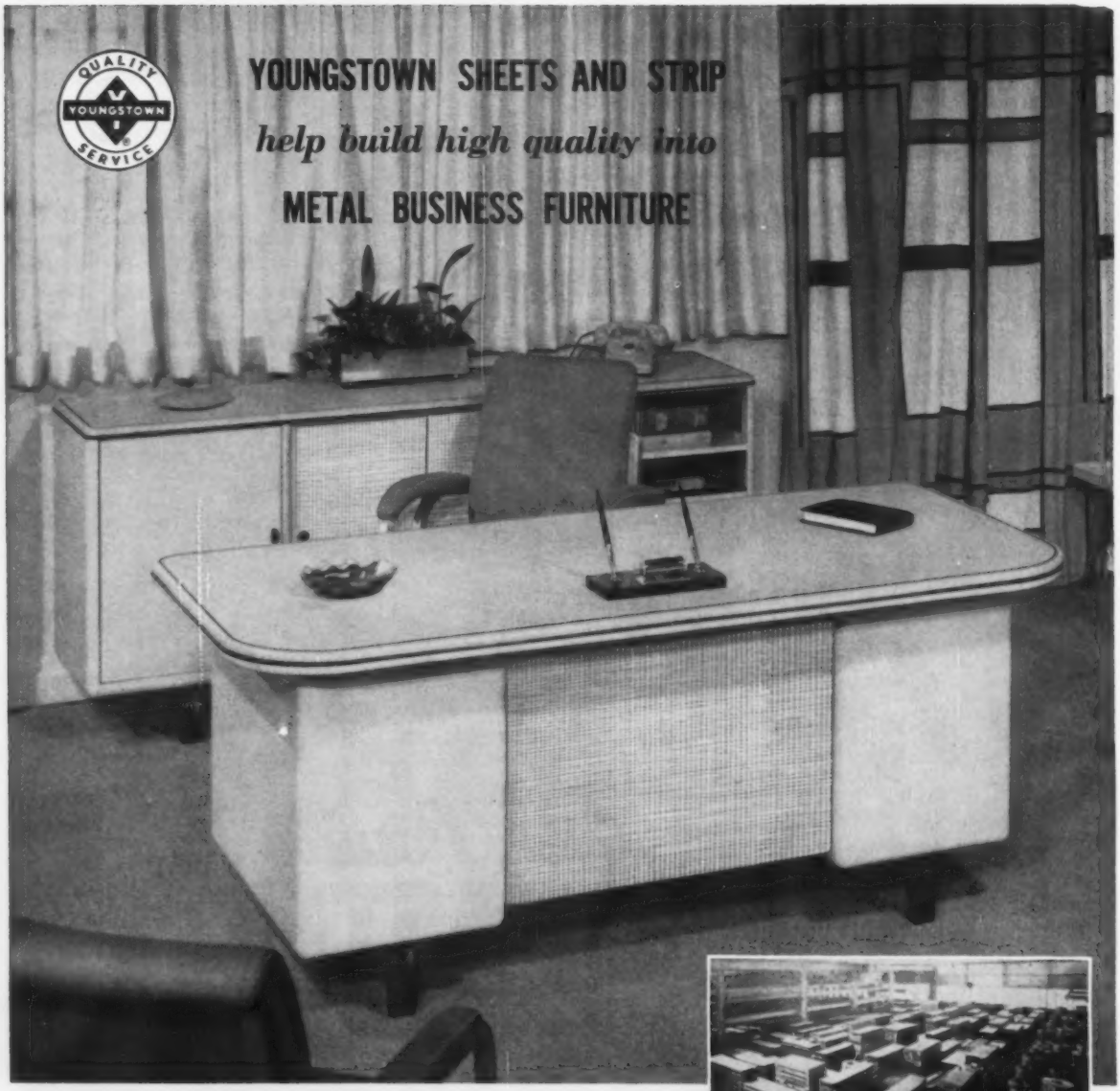

Photos courtesy The General Fireproofing Co.

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The Iron Age Summary

Mills Look at the Bright Side

Earnings are off, sales are down, and immediate steel market outlook is uncertain.

But the mills see something good about inventory shakedown and profits at low production levels.

▪ For the steel industry this week it was more of the same: Slow sales, depressed earnings, uncertain outlook. No real improvement is looked for until the automotive industry comes back into the steel market in third and fourth quarters.

The mills apparently are convinced that "nature must take its course." By this they mean that a basic recovery is not in the cards until the steel inventory shakedown is completed and industry is forced to buy steel for current needs.

Healthy Over Long Term—Steel executives feel that what the industry is now experiencing will prove healthy in the long run. "Our customers are getting a lot of excess steel out of their system, and that is going to put our industry on a sounder footing later this year and in 1959," commented one company sales manager.

While not happy about first quarter earnings reports, some mills took comfort in the fact that they made money, little as it was. To these outfits it proved they could make a profit with their mills operating at 50 pct of capacity or less.

Profit Despite Slump—Here are some examples of this type of thinking:

Avery C. Adams, president of Jones & Laughlin Steel Corp., reporting a profit of $1.6 million with shipments at 52 pct of capacity: "A profit at an abnormally low shipping rate is one of the two most important yardsticks of the capabilities of (J.&L.). The second is the potential profitability of J. & L. at higher operating rates . . ."

E. J. Hanley, president of Allegheny Ludlum Steel Corp., reporting first quarter earnings of $726,000: "Having shown that we can operate in the black at production levels representing only a little more than 50 pct of capacity, we are eager to prove . . . that with an adequate volume of business we can be more profitable than ever before."

Automotive Depressed—The depressed state of the automotive market is reflected in the sharply-curtailed output of Detroit area steel mills. Production this week is just a few points better than 10 pct of capacity.

Reports were circulating in Detroit that Buick will place a "normal" order about the end of May for 1959 models; but delivery will not be scheduled until some time in July. Chevrolet, according to one source, will begin volume production of '59 models on Sept. 22. This would indicate it doesn't intend to bring out new models much before the end of October, a little earlier than a year ago.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,293	1,270	1,312	2,304
Ingot Index				
(1947-1949=100)	80.3	79.1	81.7	143.4
Operating Rates				
Chicago	57.0	55.0*	54.0	87.0
Pittsburgh	50.5	47.0*	52.0	90.0
Philadelphia	59.0	59.0	53.0	100.0
Valley	38.0	34.5*	37.5	82.0
West	69.0	69.0*	64.0	100.0
Cleveland	28.5	29.0*	34.0	86.0
Buffalo	34.5	37.0	39.0	95.0
Detroit	12.0	13.0	21.0	90.0
South	60.0	54.0	47.5	95.0
South Ohio River	29.0	29.0	45.5	64.0
Upper Ohio River	59.0	57.5*	73.0	92.0
St. Louis	68.0	64.0*	70.0	90.0
Northeast	31.0	31.0	31.0	64.0
Aggregate	...	47.1	48.6	90.0

*Revised

Prices At a Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.967	5.967	5.967	5.670
Pig Iron (Gross ton)	$66.49	$66.49	$66.49	$64.56
Scrap, No. 1 hvy (Gross Ton)	$31.50	$31.83	$34.00	$42.83
No. 2 bundles	$22.83	$23.17	$25.17	$35.33
Nonferrous				
Aluminum ingot	26.10	26.10	28.10	27.10
Copper, electrolytic	25.00	25.00	25.00	32.00
Lead, St. Louis	11.80	11.80	12.80	15.80
Magnesium ingot	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	94.25	93.00	93.25	99.25
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

Casting Costs Get Critical Check

Companies operating captive foundries are carefully reviewing their costs.

In some cases they find it cheaper to shut down and buy castings from independent job shops.

▪ Purchasing agents in some metalworking plants are now getting a few surprising figures on foundry casting costs. Because of the recession, some captive foundries have been shut down. So plants are buying castings from independent job foundries.

The independents have made strides in modernization, and competition being what it is, their prices are under those of most captive shops. As a result, some captive shop operators are reviewing their whole cost system.

Make or Buy Debate—"Our casting costs were running 23 cents a lb on some items. While thinking of closing down our foundry, we found out we can buy the same thing outside for 16 cents a lb," one plant manager said. "We are now working out whether to close up or modernize."

A printing equipment manufacturer closed its foundry last month pointing out it had lost money in 11 of the last 14 years. A lock manufacturer found its branch plants could buy castings locally cheaper than they could be supplied from a central captive foundry.

Captives Neglected — "Independent jobbing foundries are coming up with lower cost figures than many captive shops because they have come a long way since World War II," says Don Workman, Gray Iron Founders' Society executive vice president in Cleveland.

"During World War II, companies had a terrible time with foundry materials and manpower. So after the war, many put in their own foundries. They did it for expediency and as a secondary operation. Since then, these captive foundries received scant attention or money from top management. So costs crept up unnoticed until now.

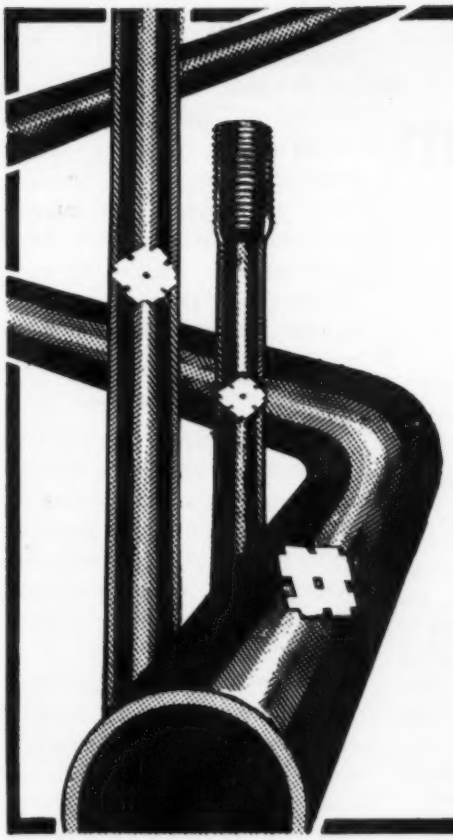
"Independent foundries meanwhile have had to modernize and mechanize to stay in business," says Mr. Workman. "They also generally have more staff and line engineers because it's their main line of business. Foundries now are offering increased service to customers, resulting in improved pattern and product design. In serving diversified lines of business they are in a unique position to offer such services.

Behind the Times — In today's market when the chips are down, many captive jobbing foundry operators are finding their lack of modern equipment catching up with them. And conversely outside foundries can do the work at substantially lower costs and still make a profit.

"There is a tendency in depressed times for captives to go outside for work to fill their foundry. Because of lack of experience in a competitive market many don't have reliable cost systems, particularly when it comes to the proper distribution of overhead to outside work."

Firms making specialized castings for presses and heavy equipment can usually make them cheaper in captive shops.

JOB FOUNDERS BUSY: Crankshaft is cleaned with grinding wheel at Muskegon, Mich., job foundry of Campbell, Wyant & Cannon. During recession independents are getting work formerly done in captive shops.



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How Much Help From Hedge Buying?

Widespread ordering to beat any steel price increases is not likely.

Warehouses, however, are stocking up to some extent.

▪ How much will hedge buying against possible steel price increases help the market?

The prospect: Only to a limited degree. There's no doubt users are concerned about higher steel costs after July 1. Some are asking their mills if increases are really coming and how large they are likely to be. A few even offer to place orders now if shown it will pay.

But the recession remains a bigger threat to users than any prospective price hikes. Buying must be justified in terms of actual need for steel. Current business conditions don't encourage stocking up indiscriminately. So for most customers hedge buying remains attractive, but impractical.

Warehouses are the exception. Distributors are interested in thinking beyond midyear. They are notifying mills to step up their orders for sheet and bar. And they are requesting delivery on the steel by late May or early June.

Sheet and Strip — Some small users are taking more sheet, but it's not enough to counteract the lack of automotive buying. May orders at **Detroit** mills are running below April levels. However, appliance makers are more active in the market for May tonnages. Cold-rolled sheet bookings in the **Midwest** are stronger. Grain bin building there and construction work in other markets has helped galvanized. Electrical sheet is also showing a little improvement.

Plate—Mills are scrambling to line up last minute tonnages as buyers hold off orders as long as they dare. Producers are operating on short rolling schedules and can add late orders for fast delivery in many cases. Heavy and alloy plate producers say bookings for May are fairly good but they are hustling to snare orders. Some users in the **Midwest** are selling off small stocks of plate from their inventories.

In the **East,** Lukens Steel Co., the last remaining premium alloy plate producer, reduced its price $6 a ton down to the levels of other mills in the area.

Jones & Laughlin Steel Corp. has announced its strip mill at Pittsburgh will begin production of floor plate this month. The size range will be from ⅛ in. x 60 in. to ½ in. x 77 in. in lengths up to 480 in.

Bar—There may be an upturn in hot-rolled bar sales this month. **Pittsburgh** producers are predicting it, although the needed orders haven't yet materialized. **Midwest** mills report hot-rolled is stronger. Responsible for the improvement are purchases by farm equipment makers and warehouses. Appliance buyers are also apparently ready to enter the market more heavily. They are beginning to increase production schedules. **West Coast** warehouses are stocking up again on hot-rolled. **Detroit** area mills, however, don't expect to hear from automotive bar users until late summer.

Pipe and Tubing—Standard pipe continues to improve seasonally. However, oil country seamless remains depressed. Users have just about stopped placing orders with drilling activity down by 20 pct. They are content to work off heavy inventories.

Mechanical tubing is another product in the doldrums. Linepipe languishes while the Memphis case appeal awaits settlement. Mills can now furnish linepipe under 24 in. right out of stock. Orders are coming in very slowly. Only about a third of the tonnage shipped during a month is on the books as the month starts.

In the **Farwest** continuous weld pipe in sizes ½ in. through 4 in. is moving well. Business is coming from housing and building construction industries.

Wire Products—Even some seasonal improvement has not lifted the market very far. Sales are "slightly better," one large producer says, but adds mills are operating at 40-50 pct of capacity. Imports still siphon away sales for merchant and construction wire products. Domestic mills are trying to combat foreign-made product by promising fast delivery. However they find it tough to beat the price competition.

Manufacturers wire remains slow. Users in some cases are substituting other materials they have in stock in an effort to clean out inventories before reordering.

PURCHASING AGENT'S CHECKLIST

Chances slim for capital goods upturn before '60. **P. 37**

The best way to select carbide cutting tools. **P. 41**

Alcoa will introduce "can" of foil and fibreboard. **P. 42**

COMPARISON OF PRICES

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in **Heavy Type**; declines appear in *Italics*.

	Apr. 29 1958	Apr. 22 1958	Apr. 1 1958	Apr. 30 1957
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.925¢	4.925¢	4.925¢	4.675¢
Cold-rolled sheets	6.05	6.05	6.05	5.75
Galvanized sheets (10 ga.)	6.60	6.60	6.60	6.30
Hot-rolled strip	4.925	4.925	4.925	4.675
Cold-rolled strip	7.17	7.17	7.17	6.870
Plate	5.12	5.12	5.12	4.87
Plates, wrought iron	13.15	13.15	13.15	10.40
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	50.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.30	$10.30	$10.30	$10.30
Tin plates, electro (0.50 lb.)	9.00	9.00	9.00	9.00
Special coated mfg. ternes	9.55	9.55	9.55	9.55
Bars and Shapes: (per pound)				
Merchant bar	5.425¢	5.425¢	5.425¢	5.075¢
Cold finished bars	7.30	7.30	7.30	6.85
Alloy bars	6.475	6.475	6.475	6.125
Structural shapes	5.275	5.275	5.275	5.00
Stainless bars (No. 302)	45.00	45.00	45.00	43.25
Wrought iron bars	14.45	14.45	14.45	11.50
Wire: (per pound)				
Bright wire	7.65¢	7.65¢	7.65¢	7.20¢
Rails: (per 100 lb.)				
Heavy rails	$5.525	$5.525	$5.525	$5.275
Light rails	6.50	6.50	6.50	6.25
Semifinished Steel: (per net ton)				
Rerolling billets	$77.50	$77.50	$77.50	$74.00
Slabs, rerolling	77.50	77.50	77.50	74.00
Forging billets	96.00	96.00	96.00	91.50
Alloy blooms, billets, slabs	114.00	114.00	114.00	107.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.15¢	6.15¢	6.15¢	5.80¢
Skelp	4.875	4.875	4.875	4.225
Finished Steel Composite: (per pound)				
Base price	5.967¢	5.967¢	5.967¢	5.670¢

	April 29 1958	April 22 1958	April 1 1958	April 30 1957
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.97	$70.97	$70.97	$68.88
Foundry, Valley	66.50	66.50	66.50	65.00
Foundry, Southern Cin'ti	73.87	73.87	73.87	67.17
Foundry, Birmingham	62.50	62.50	62.50	59.00
Foundry, Chicago	66.50	66.50	66.50	65.00
Basic, del'd Philadelphia	70.47	70.47	70.47	68.38
Basic, Valley furnace	66.00	66.00	66.00	64.50
Malleable, Chicago	66.50	66.50	66.50	65.00
Malleable, Valley	66.50	66.50	66.50	65.00
Ferromanganese 74-76 pct Mn, cents per lb‡	12.25	12.25	12.25	12.75
Pig Iron Composite: (per gross ton)				
Pig iron	$66.49	$66.49	$66.49	$64.56
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$32.50	$32.50	$34.50	$42.50
No. 1 steel, Phila. area	*34.50*	35.50	38.00	47.50
No. 1 steel, Chicago	27.50	27.50	29.50	38.50
No. 1 bundles, Detroit	21.50	21.50	24.50	34.50
Low phos., Youngstown	32.50	32.50	34.50	44.50
No. 1 mach'y cast, Pittsburgh	48.50	48.50	51.50	51.50
No. 1 mach'y cast, Phila.	47.50	47.50	49.50	55.50
No. 1 mach'y cast, Chicago	41.50	41.50	46.50	45.00
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	*$31.50*	$31.83	$34.00	$42.83
No. 2 bundles	*22.83*	23.17	25.17	35.33
Coke Connellsville: (per net ton at oven)				
Furnace coke, prompt	$15.38	$15.38	$15.38	$15.38
Foundry coke, prompt	$17.50-$19	$17.50-$19	17.50-$19	$17.50-$19
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	25.00	25.00	25.00	32.00
Copper, Lake, Conn.	25.00	25.00	25.00	32.00
Tin, Straits, N. Y.	94.25†	93.00	93.25	99.25
Zinc, East St. Louis	10.00	10.00	10.00	13.50
Lead, St. Louis	11.80	11.80	12.80	15.80
Aluminum, virgin ingot	26.10	26.10	28.10	27.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	33.00

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDEX TO PRICE PAGES

Prices At a Glance 115
Comparison of Prices 119
Bars 128
Billets, Blooms and Slabs 126
Boiler Tubes 131
Bolts, Nuts, Rivets, Screws 130
Clad Steel 131
Coke 131
Electrical Sheets 131
Electrodes 131
Electroplating Supplies 130
Ferroalloys 133
Iron Ore 131
Merchant Wire Products 131
Metal Powders 130
Nonferrous
- Mill products 125
- Primary prices 115-124-125
- Remelted metals 125
- Scrap 125

Pig Iron 132
Pipe and Tubing 129
Plates 128
Rails 131
Refractories 131
Shapes 126
Sheets 127
Spring Steel 131
Stainless 132
Steel Scrap 122
Strip 126
Structurals 126
Tinplate 127
Tool Steel 131
Track Supplies 131
Warehouse Prices 130
Water Pipe Index 130
Wire 128
Wire Rod 127

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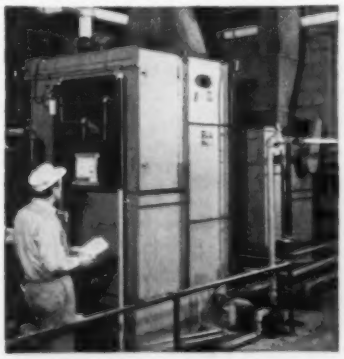

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Market Still Weak, But Leveling Off

Most markets are down or on the verge, but declines are less general.

Auto lists are off less than expected and some of the hopeful tone of the steel market has slipped into the scrap market.

▪ Price declines are less general this week, indicating the market may be approaching a floor.

There is still little optimism in the trade, although some stronger feeling in the steel industry has slipped over into the scrap market. It is not enough to raise prices in any market, but has helped in stemming the decline.

Auto industrial lists were going at from $2 to $3 less than a month ago, but that decline was less than anticipated. Affected markets had dropped at least that much in the interval, reflecting another stabilizing force.

But the market is still woefully weak and a leveling off does not indicate a rebound in the near future. Mill inventories are high, and dealers in most areas are holding more than is comfortable.

Meanwhile, the Institute of Scrap Iron & Steel has protested to the European Coal & Steel Community against exclusion of galvanized from No. 2 bundles and heavy melting steel and against a proposed modification to pay 80 pct instead of 90 pct against letters of credit.

Pittsburgh — Prices of most grades are holding here as a slightly better feeling in the steel industry has carried over to some brokers. There is no great strength in the market, but brokers are talking hopefully where a week ago they saw no hope. For the first time in weeks all district mills are operating. No one is buying any tonnage, but everyone realizes current bargain levels can't last forever. A sale of stainless confirms the present level of $175 for 18-8 bundles and solids. Big foundries are holding back on cast purchases.

Chicago—The market sag halted more from lack of business than any strong purchases by mills. A spot sale of No. 2 heavy melting failed to halt continuing purchases of the grade at lower prices and does not seem to indicate any new strength in the market. Electric furnace grades continue to sink, narrowing the spread between electric furnace and openhearth grades.

Philadelphia—The first sale of No. 1 heavy melting to a domestic mill in many weeks was made at $34, two dollars under the quoted price. It was followed quickly by another sale to a second mill at $35. The tonnage involved in the second order was reportedly considerably larger, establishing the price level.

New York—Export orders continue to prop up steelmaking grade prices, but these are expected to wither away shortly. The trade looks for a barren spring if domestic business does not perk up soon. Only other activity has been a small domestic order for short shoveling turnings at $11, a drop of $1.

Detroit—There has been little activity this week as brokers and dealers turn their attention to industrial lists. Early lists were off only about $3 from a month ago with No. 1 bundles bringing $28 to $29. The drop was less than expected and is attributed to smaller industrial scrap anticipated for May.

Cleveland—Industrial lists were selling about $2 off from a month ago, but still higher than expected. Early lists went for about $31 on cars. The market is still practically dead, with only a few old orders around.

St. Louis—Prices of scrap in the St. Louis district are confused, with one leading mill reducing its prices $2 for the first two weeks in May, while another is buying at unchanged prices.

Birmingham — Movement of scrap in the Southeast is slow and the market weak, with brokers anticipating still lower prices when consumers buy again. One major consumer of openhearth and electric furnace scrap is restricting shipments of purchases made last month.

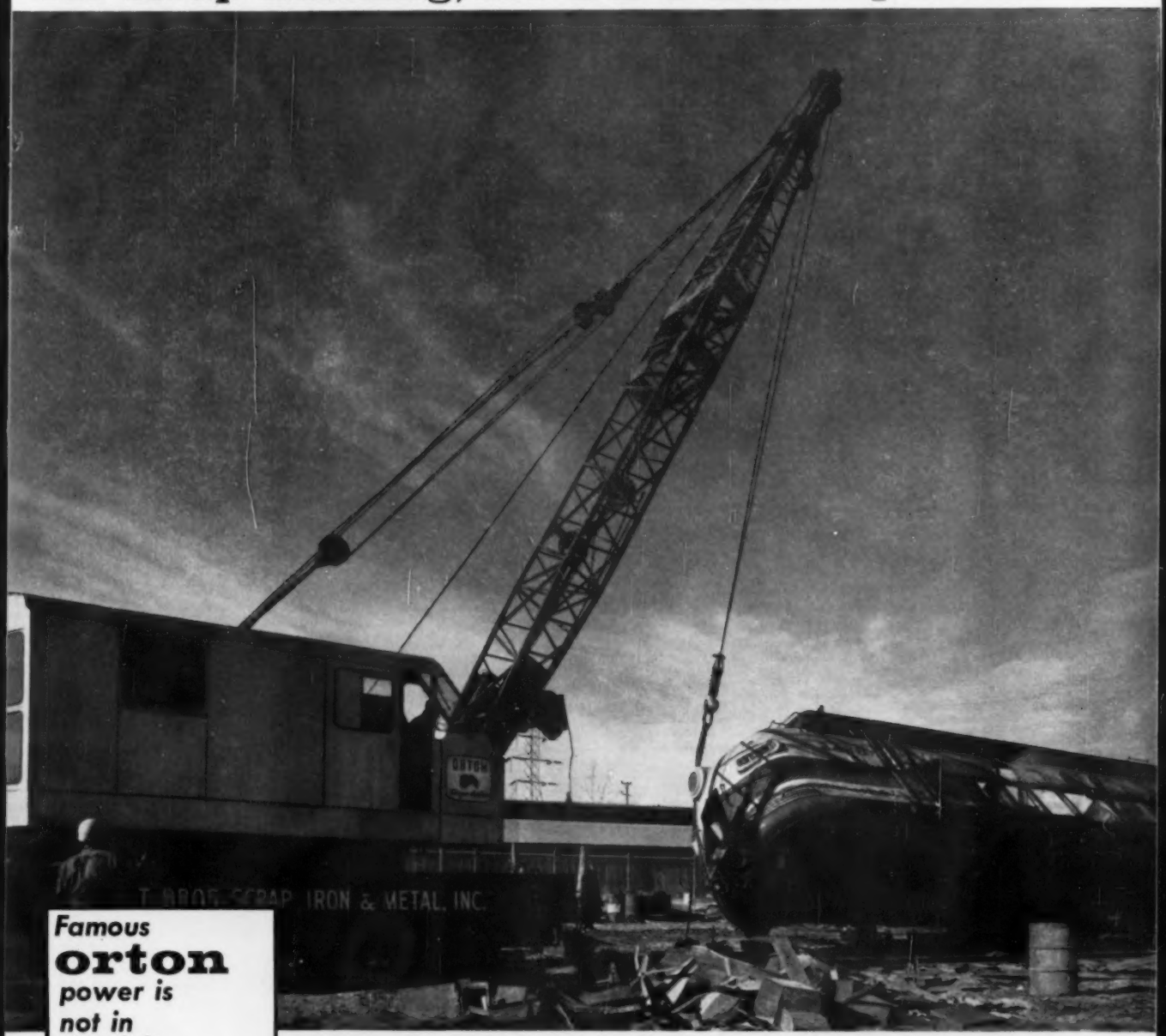
Cincinnati—Prices weakened $1 on appraisal, with mills only casually interested in a few grades. The market is topsy-turvey in some aspects because industrial scrap is going for less than dealers will sell theirs.

Buffalo — A small purchase of No. 2 grades was made at slightly under previously quoted prices. The rest of the market continues very weak.

Boston — The market continues to move along on the bottom, with further weakness bringing declines in turnings prices. Because there is no trading in the grade, the listing, electric furnace 3 ft and under, has been dropped from the Boston market.

West Coast — Prices are weak. Dealers look for a $2 per ton drop next week. There's no life to the market and mills are buying little.

for scrap handling, use **orton** experience



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CRANE AND SHOVEL CO.
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CHICAGO 5, ILLINOIS

SCRAP PRICES *(Effective April 29, 1958)*

Pittsburgh

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	32.00 to 33.00
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	32.00 to 33.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and ms. turn.	12.00 to 13.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. punch'gs plate	37.00 to 38.00
Heavy turnings	28.00 to 29.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	50.00 to 51.00
Rails 2 ft and under	54.00 to 55.00
RR steel wheels	45.00 to 46.00
RR spring steel	45.00 to 46.00
RR couplers and knuckles	45.00 to 46.00
No. 1 machinery cast	48.00 to 49.00
Cupola cast	40.00 to 41.00
Heavy breakable cast	38.00 to 39.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	100.00
430 bundles and solids	95.00 to 100.00
410 turnings	45.00

Chicago

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	27.00 to 28.00
No. 1 factory bundles	33.00 to 34.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	27.00 to 28.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	40.00 to 41.00
Low phos. punch'gs plate	34.00 to 35.00
Low phos. 3 ft and under	32.00 to 33.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	42.00 to 43.00
Rerolling rails	50.00 to 51.00
Rails 2 ft and under	45.00 to 46.00
Locomotive tires cut	41.00 to 42.00
Cut bolsters & side frames	38.00 to 39.00
Angles and splice bars	42.00 to 43.00
RR steel car axles	51.00 to 52.00
RR couplers and knuckles	38.00 to 39.00
No. 1 machinery cast	41.00 to 42.00
Cupola cast	34.00 to 35.00
Heavy breakable cast	32.00 to 33.00
Cast iron brake shoes	34.00 to 35.00
Cast iron wheels	30.00 to 31.00
Malleable	46.00 to 47.00
Stove plate	33.00 to 34.00
Steel car wheels	36.00 to 37.00
Stainless	
18-8 bundles and solids	160.00 to 165.00
18-8 turnings	80.00 to 90.00
430 bundles and solids	90.00 to 95.00
430 turnings	45.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	23.00 to 24.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	15.00 to 16.00
Cast iron borings	16.00 to 17.00
Shoveling turnings	17.00 to 18.00
Clean cast. chem. borings	31.00 to 32.00
Low phos. 5 ft and under	38.00 to 39.00
Low phos. 2 ft and under	39.00 to 40.00
Low phos. punch'gs	39.00 to 40.00
Elec furnace bundles	34.00 to 35.00
Heavy turnings	28.00 to 29.00
RR steel wheels	42.50 to 43.50
RR spring steel	42.50 to 43.50
Rails 18 in. and under	56.00 to 58.00
Cupola cast	37.00 to 38.00
Heavy breakable cast	40.00 to 41.00
Cast iron car wheels	43.00 to 44.00
Malleable	59.00 to 60.00
Unstripped motor blocks	30.00 to 31.00
No. 1 machinery cast	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.50 to $28.50
No. 2 hvy. melting	24.50 to 25.50
No. 1 dealer bundles	27.50 to 28.50
No. 2 bundles	18.00 to 19.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	10.00 to 11.00
Low phos, 18 in. and under	36.00 to 37.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	52.00 to 53.00
No. 1 cupola cast	36.00 to 37.00
Hvy. breakable cast	32.00 to 33.00
Drop broken cast	44.00 to 45.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	28.00 to 29.00
No. 1 factory bundles	32.50 to 33.50
No. 2 bundles	19.00 to 20.00
No. 1 busheling	28.00 to 29.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Cut structural & plates, 2 ft & under	35.00 to 36.00
Drop forge flashings	28.00 to 29.00
Low phos. punch'gs plate	29.00 to 30.00
Foundry steel, 2 ft & under	32.00 to 33.00
No. 1 RR heavy melting	34.50 to 35.50
Rails 2 ft and under	53.00 to 54.00
Rails 18 in. and under	54.00 to 55.00
Railroad grate bars	14.00 to 15.00
Steel axle turnings	17.00 to 18.00
Railroad cast	46.00 to 47.00
No. 1 machinery cast	45.00 to 46.00
Stove plate	42.00 to 43.00
Malleable	58.00 to 59.00
Stainless	
18-8 bundles	160.00 to 165.00
18-8 turnings	85.00 to 90.00
430 bundles	80.00 to 90.00
430 turnings	35.00 to 40.00

Buffalo

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 busheling	26.00 to 27.00
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	13.00 to 14.00
Low phos. plate	32.00 to 33.00
Structurals and plate, 2 ft and under	35.00 to 36.00
Scrap rails, random lgth.	39.00 to 40.00
Rails 2 ft and under	49.00 to 50.00
RR steel wheels	36.00 to 37.00
RR spring steel	32.00 to 33.00
RR couplers and knuckles	32.00 to 33.00
No. 1 machinery cast	45.00 to 46.00
No. 1 cupola cast	41.00 to 42.00

St. Louis

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	15.00 to 16.00
Cast iron borings	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
No. 1 RR hvy. melting	35.00 to 36.00
Rails, random lengths	42.00 to 43.00
Rails, 18 in. and under	48.00 to 49.00
Angles and splice bars	43.00 to 44.00
Std. steel car axles	47.00 to 48.00
RR specialties	38.00 to 39.00
Cupola cast	43.00 to 44.00
Heavy breakable cast	32.00 to 33.00
Cast iron brake shoes	35.00 to 36.00
Stove plate	37.00 to 38.00
Cast iron car wheels	35.00 to 36.00
Rerolling rails	47.00 to 48.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	30.00 to 31.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	22.00 to 23.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	12.00 to 13.00
Electric furnace bundles	35.00 to 36.00
Elec. furnace, 3 ft & under	33.00 to 34.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft	36.00 to 37.00
No. 1 RR hvy. melting	31.00 to 32.00
Scrap rails, random lgth.	41.00 to 42.00
Rails, 18 in. and under	47.00 to 48.00
Angles & splice bars	37.00 to 38.00
Rerolling rails	45.00 to 46.00
No. 1 cupola cast	48.00 to 49.00
Stove plate	48.00 to 49.00
Charging box cast	22.00 to 23.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	37.00 to 38.00

Youngstown

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	17.00 to 18.00
Low phos. plate	32.00 to 33.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	22.00 to 23.00
No. 2 dealer bundles	15.50 to 16.50
Machine shop turn.	7.00 to 8.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	22.00 to 23.00
No. 1 machinery cast	32.00 to 33.00
Mixed yard cast	31.00 to 32.00
Charging box cast	29.00 to 30.00
Heavy breakable cast	29.00 to 30.00
Unstripped motor blocks	22.00 to 23.00
Stainless	
18-8 prepared solids	135.00 to 140.00
18-8 turnings	45.00 to 50.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	16.00 to 17.00
No. 1 dealer bundles	22.00 to 23.00
No. 2 bundles	12.00 to 13.00
No. 1 busheling	21.00 to 22.00
Drop forge flashings	20.00 to 21.00
Machine shop turn.	5.00 to 6.00
Mixed bor. and turn.	6.00 to 7.00
Shoveling turnings	7.00 to 8.00
Cast iron borings	7.00 to 8.00
Low phos. punch'gs plate	21.00 to 22.00
No. 1 cupola cast	31.00 to 32.00
Heavy breakable cast	21.00 to 22.00
Mixed cupola cast	26.00 to 27.00
Automotive cast	31.00 to 32.00
Stainless	
18-8 bundles and solids	155.00 to 160.00
18-8 turnings	55.00 to 60.00
430 bundles and solids	70.00 to 75.00
410 turnings	20.00 to 25.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	13.00 to 14.00
No. 1 busheling	23.00 to 24.00
Machine shop turn.	3.00 to 4.00
Mixed bor. and short turn.	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast	31.00 to 32.00
Mixed cupola cast	26.00 to 27.00
Heavy breakable cast	29.00 to 30.00
Stove plate	26.00 to 27.00
Unstripped motor blocks	24.00 to 25.00

San Francisco

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	28.00
No. 2 bundles	22.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 RR hvy. melting	32.00
No. 1 cupola cast	42.00

Los Angeles

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	32.00
No. 1 dealer bundles	30.00
No. 2 bundles	$20.00 to 22.00
Machine shop turn.	9.00 to 11.00
Shoveling turnings	11.00 to 13.00
Cast iron borings	11.00 to 13.00
Elec. furn. 1 ft and under (foundry)	45.00
No. 1 RR hvy. melting	36.00
No. 1 cupola cast	41.00

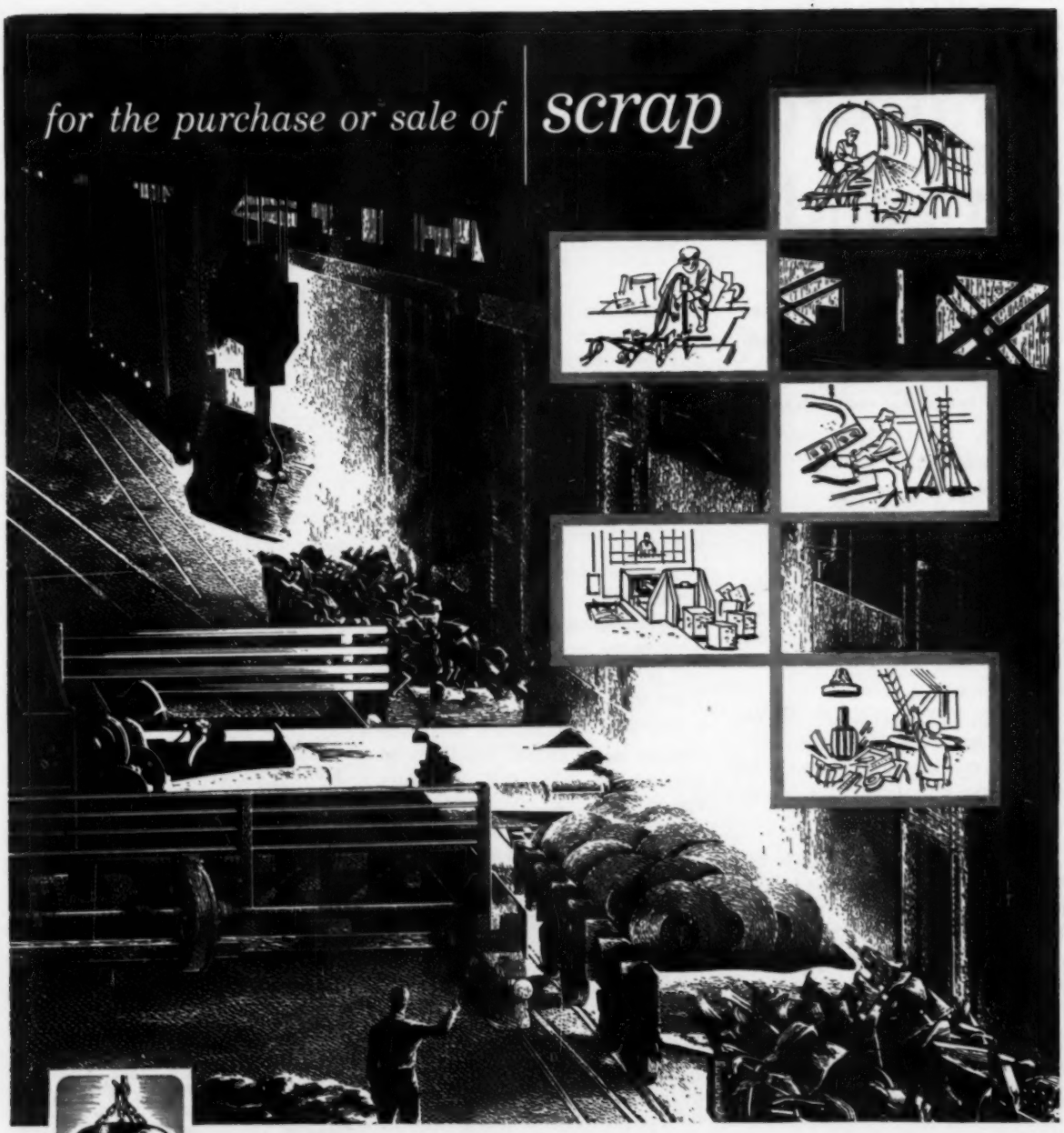
Seattle

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	30.00
No. 2 bundles	24.00
No. 1 cupola cast	36.00
Mixed yard cast	36.00

Hamilton, Ont.

No. 1 hvy. melting	$30.00
No. 2 hvy. melting	26.00
No. 1 dealer bundles	30.00
No. 2 bundles	23.00
Mixed steel scrap	25.00
Busheling	20.00
Bush., new fact., prep'd	30.00
Bush., new fact., unprep'd	28.00
Machine shop turn.	15.00
Short steel turn.	19.00
Mixed bor. and turn.	15.00
Rails, rerolling	39.00
Cast scrap	$45.00 to 50.00

for the purchase or sale of **scrap**



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Tariff Group Split On Lead-Zinc

Democrats ask smaller hikes than Republicans, who also advise import quotas.

Trade looks for no action for 60 days, gives import quotas little chance.

U. S. producers look abroad for new properties.

▪ President Eisenhower has the recommendations of the Tariff Commission, for protection of domestic lead and zinc industries from imports.

The six-man commission split on partisan lines. But it was the Democrats who made suggestions closer to the Administration's overall policy on foreign trade.

Tariff Suggested — They recommend a hike in tariffs to only 2⅛¢ per lb on lead, and 1¾¢ per lb on zinc. The current tariff is 1 1/16¢ per lb on lead, and 7/10¢ per lb on zinc.

The three Republicans, including recently re-appointed chairman Edgar B. Brossard, and vice chairman Joseph E. Talbot, suggested: (1) The limit allowed under our reciprocal trade agreement—2.55¢ per lb on lead, and 2 1/10¢ per lb on zinc; and (2) quota on imports of 221,700 tons of contained lead, and 325,600 tons of contained zinc annually.

The suggestion of import quotas was a surprise, because at the public hearings the U. S. miners were not solidly behind it. The trade have given quotas little chance, based on testimony at the hearings.

New Meaning—What does this mean? Says one lead consumer, "Before it was simply a question of lead and zinc problems. Now this has become a pawn in the battle over reciprocal trade agreements."

Most of the trade expects the President to pocket the recommendations for the legal limit of 60 days. Then, they expect his action to reflect his appraisal of his strength on extension of reciprocal trade laws.

The President favors lower, not higher tariffs. He has asked Congress to extend reciprocal trade agreements for another five years, and give him the power to cut tariffs 5 pct each year.

He was expected to find most support in the House. But lately he has run into some stiff opposition here, from a solid block of western mining states representatives, who have logrolled support from the South.

What Will Happen — Here is what the trade says will probably happen. The quotas have almost no chance, and will probably be used only for trading. If Ike gains strength on reciprocal trade he will approve the lower hikes suggested by the Democrats. If he loses ground he will probably go along with the tariff recommendations of the Republican members of the group.

On reciprocal trade, Washington observers now give Ike little chance to get what he wants. Most likely, they say, is a one-year extension, watered down with amendments to prevent much tariff cutting.

The opponents of import quotas and higher tariffs have not rested their case. An impressive booklet, called "The Case Against Increased Import Barriers on Lead and Zinc," was released by The Committee for a National Trade Policy, at the same time as the Tariff Commission findings. It cites a dozen arguments against increased import barriers.

Look Abroad—The failure of the Tariff Commission to take concerted action to resolve the issue is spotlighting some new thinking by major U. S. lead and zinc producers. "If you can't beat 'em, join 'em." Several say they may gradually shift the bulk of their mining operations to foreign locations.

Market Notes

Titanium — Titanium Metals Corp. of America has knocked its prices down for the seventh time since 1954. The overall cut is 10 pct, with some high strength alloy plate and billet dropped 20 to 30 pct.

Nickel—International Nickel Co. announced it will reduce output by about 10 pct. New operating rate will be at about 250 million lb per year.

Tin prices for the week: April 23 —93.00; April 24—93.25; April 25 —93.50; April 28—94.00; April 29 —94.25.*

* Estimate.

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum pig	24.00	26.00	4/1/58
Aluminum ingot	26.10	28.10	4/1/58
Copper (E)	25.00	27.00	1/13/58
Copper (CS)	23.75	23.50	4/23/58
Copper (L)	25.00	27.00	1/13/58
Lead, St. L.	11.80	12.80	4/2/58
Lead, N. Y.	12.00	13.00	4/2/58
Magnesium ingot	38.00	34.00	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	84.58	12/6/56
Titanium sponge	185-200	200-250	4/1/58
Zinc, E. St. L.	10.80	10.80	7/1/57
Zinc, N. Y.	10.50	11.00	7/1/57

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see above; other primary prices, pg. 125.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136-.249	.250-3.
1100, 3003	44.6	42.3	41.1	41.7
5052	52.0	46.9	45.2	44.4
6061-0	49.4	45.0	43.2	43.1

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6- 8	45.0-46.8	58.4-62.1
12-14	45.7-47.2	59.3-63.8
24-26	49.0-49.5	70.1-74.8
36-38	58.0-58.6	94.2-97.8

Screw Machine Stock—2011-T-3

Size*	¼	⅝-⅞	⅜-1	1¼-1½
Price	61.0	60.5	59.0	56.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.411	$1.884	$2.353	$2.823
.024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	108.1
AZ31B Spec.	.....	93.3	95.7	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	126	106	128
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	120	105	121
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	48.13	.....	45.36	48.32
Brass, 70/30	42.69	43.23	42.63	45.60
Brass, Low	44.90	45.44	44.84	47.71
Brass, R L	45.67	46.21	45.61	48.48
Brass, Naval	47.07	.....	41.38	50.48
Munts Metal	45.19	.....	41.00	.....
Comm. Bs.	46.98	47.52	46.92	49.54
Mang. Bs.	50.81	.....	44.91	.....
Phos. Bz. 5%	67.17	.....	67.67	.....

Free Cutting Brass Rod 31.03

TITANIUM

(Freight included in 5000 lbs)

Sheet and strip, commercially pure, $8.50-$10.10; alloy, $15.95; Plate, HR, commercially pure, $6.00-$6.75; alloy, $8.75-$9.50. Wire, rolled and/or drawn, commercially pure, $6.50-$7.00; alloy, $10.00-$11.50; Bar, HR or forged, commercially pure, $5.25-$5.50; alloy, $5.25-$6.35; billets, HR, commercially pure, $4.10-$4.35; alloy, $4.10-$4.20.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium aluminum 5% Be, Dollar per lb contained Be $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.55
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic basis... $ 1.31
Cobalt, 97-99% (per lb).... $2.00 to $2.07
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 39.50 to 50.00
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz..... $80 to $90
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb.... 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $229 to $233
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 71.25
Palladium, dollars per troy oz... $19 to $21
Platinum, dollars per troy oz... $67 to $72
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.)..... 88.625
Thorium, per kg. $43.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $ 5.00

Remelted Metals

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 25.25
- No. 120 ..... 24.25
- No. 123 ..... 23.50

80-10-10 ingot
- No. 305 ..... 29.25
- No. 315 ..... 27.25

88-10-2 ingot
- No. 210 ..... 36.25
- No. 215 ..... 32.00
- No. 245 ..... 28.75

Yellow ingot
- No. 405 ..... 21.25

Manganese bronze
- No. 421 ..... 23.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.00-24.25
- 0.60 copper max. 23.75-24.00

Piston alloys (No. 122 type)..23.25-24.25
No. 12 alum. (No. 2 grade)...21.00-21.75
108 alloy 21.50-22.25
195 alloy 24.00-25.50
13 alloy (0.60 copper max.)...23.75-24.00
AXS-679 (1 pct zinc) 21.25-22.25

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 22.00-23.50
Grade 2—92-95% 21.00-21.75
Grade 3—90-92% 20.00-20.75
Grade 4—85-90% 17.50-18.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	21	20¼
Yellow brass	16⅛	14½
Red brass	18⅝	17⅞
Comm. bronze	19¼	18½
Mang. bronze	14⅞	14⅛
Yellow brass rod ends	15⅞	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 19¾
No. 2 copper wire 18¼
Light copper 16
*Refinery brass 17¾
Copper bearing material 17
*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 19¾
No. 2 copper wire 18¼
Light copper 16
No. 1 composition 18½
No. 1 comp. turnings 18
Hvy. yellow brass solids 13
Brass pipe 15
Radiators 14¼

Aluminum

Mixed old cast. ..... 12 —13
Mixed new clips ..... 14½—15½
Mixed turnings, dry ..... 12½—13½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire ..... 17½—18
No. 2 copper wire ..... 15½—16
Light copper ..... 13½—14
Auto radiators (unsweated). 11 —11½
No. 1 composition ..... 14½—15
No. 1 composition turnings.. 13½—14
Cocks and faucets ..... 12 —12½
Clean heavy yellow brass ... 10 —10½
Brass pipe ..... 12 —12½
New soft brass clippings .... 13 —13½
No. 1 brass rod turnings .... 10½—11

Aluminum

Alum. pistons and struts .... 5 — 5½
Aluminum crankcases ..... 9½—10
1100 (2S) aluminum clippings 12½—13
Old sheet and utensils ..... 9½—10
Borings and turnings ..... 6 — 6½
Industrial castings ..... 9½—10
2024 (24S) clippings ..... 11 —11½

Zinc

New zinc clippings ..... 4 — 4½
Old zinc ..... 3 — 3¼
Zinc routings ..... 1¾— 2
Old die cast scrap ..... 1½— 1¾

Nickel and Monel

Pure nickel clippings 42-45
Clean nickel turnings 37-40
Nickel anodes 42-45
Nickel rod ends 42-45
New Monel clippings 28-29
Clean Monel turnings 20-23
Old sheet Monel 25-26
Nickel silver clippings, mixed. 18
Nickel silver turnings, mixed. 15

Lead

Soft scrap lead ..... 7½— 8
Battery plates (dry) ..... 2¾— 3
Batteries, acid free ..... 1¾— 2

Miscellaneous

Block tin ..... 75 —76
No. 1 pewter ..... 59 —60
Auto babbitt ..... 39 —40
Mixed common babbitt ..... 11 —11½
Solder joints ..... 14½—15
Siphon tops 42
Small foundry type ..... 12 —12¼
Monotype ..... 12 —12¼
Lino. and stereotype ..... 11 —11¼
Electrotype ..... 10 —10¼
Hand picked type shells .... 7 — 7½
Lino. and Stereo. dross ..... 3 — 3¼
Electro. dross ..... 2½— 2¾

(Effective April 28, 1958)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$114.00 *B3*		5.325 *B3*	7.80 *B3*	5.325 *B3*						
	Buffalo, N. Y.	$77.50 *R3, B3*	$96.00 *R3, B3*	$114.00 *R3, B3*	6.225 *B3*	5.325 *B3*	7.80 *B3*	5.325 *B3*	4.925 *R3, B3*	7.15 *S10*	7.325 *B3*			
	Phila., Pa.									7.70 *P15*				
	Harrison, N. J.													15.05 *C11*
	Conshohocken, Pa.		$101.00 *A2*	$121.00 *A2*					4.975 *A2*	7.20 *A2*	7.325 *A2*			
	New Bedford, Mass.									7.60 *R6*				
	Johnstown, Pa.	$77.50 *B3*	$96.00 *B3*	$114.00 *B3*		5.325 *B3*	7.80 *B3*							
	Boston, Mass.									7.70 *T8*				15.40 *T8*
	New Haven, Conn.									7.60 *D1*				
	Baltimore, Md.									7.15 *T8*				
	Phoenixville, Pa.					5.325 *P2*		5.325 *P2*						
	Sparrows Pt., Md.								4.925 *B3*		7.325 *B3*			
	New Britain, Bridgeport, Wallingford, Conn.			$114.00 *N8*						7.60 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.70 *N7* 7.70 *A5*				15.40 *N7* 15.20 *T8*
MIDDLE WEST	Alton, Ill.								5.125 *L1*					
	Ashland, Ky.								4.925 *A7*					
	Canton-Massillon, Dover, Ohio		$95.50 *R3*	$114.00 *R3, T5*						7.15 *G4*		10.45 *G4*		14.85 *C11*
	Chicago, Ill. Franklin Park, Ill. Evanston, Ill.	$77.50 *U1, R3*	$96.00 *U1, R3,W8*	$114.00 *U1, R3,W8*	6.225 *U1*	5.275 *U1, W8,P13*	7.75 *U1,Y1 W8*	5.275 *U1*	4.925 *W8, N4,A1*	7.25 *A1,T8 M8*			8.10 *W8, S9,I3*	15.05 *A1, S9,G4*
	Cleveland, Ohio									7.15 *A5,J3*		10.45 *A5*	8.10 *J3*	
	Detroit, Mich.			$114.00 *R5*					5.025 *G3, M2*	7.25 *M2,D1, D2,G3,P11*	7.425 *G3*	10.60 *D2* 10.55 *G3*	8.10 *G3*	
	Anderson, Ind.									7.15 *G4*				
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$77.50 *U1*	$96.00 *U1*	$114.00 *U1, Y1*		5.275 *U1, I3*	7.75 *U1, I3*	5.275 *I3*	4.925 *U1, I3,Y1*	7.15 *Y1*	7.325 *U1, I3,Y1*	10.60 *Y1*	8.10 *U1, Y1*	
	Sterling, Ill.	$77.50 *N4*				5.275 *N4*			5.025 *N4*					
	Indianapolis, Ind.									7.30 *J3*				15.20 *J3*
	Newport, Ky.												8.10 *A9*	
	Middletown, Ohio													
	Niles, Warren, Ohio Sharon, Pa.		$96.00 *S1, C10*	$114.00 *C10,S1*					4.925 *R3, S1*	7.15 *R3,T4 S1*	7.325 *R3, S1*	10.50 *S1* 10.45 *R3*	8.10 *S1*	15.05 *S1*
	Owensboro, Ky.	$77.50 *G5*	$96.00 *G5*	$114.00 *G5*										
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Aliquippa, Pa.	$77.50 *U1, P6*	$96.00 *U1, C11,P6*	$114.00 *U1, C11,B7*	6.225 *U1*	5.275 *U1, J3*	7.75 *U1, J3*	5.275 *U1*	4.925 *P6*	7.15 *J3,B4*			8.10 *S9*	15.05 *S9*
	Weirton, Wheeling, Follansbee, W. Va.				6.225 *W3*	5.275 *W3*		5.275 *W3*	4.925 *W3*	7.15 *W3,F3*	7.325 *W3*	10.50 *W3*		
	Youngstown, Ohio	$77.50 *R3*	$96.00 *Y1, C10*	$114.00 *Y1*			7.75 *Y1*			7.15 *Y1,J3*	7.325 *U1, Y1*	10.65 *Y1*	8.10 *U1, Y1*	15.05 *J3* 10.65 *Y1*
WEST	Fontana, Cal.	$88.00 *K1*	$105.50 *K1*	$135.00 *K1*		6.075 *K1*	8.55 *K1*	6.225 *K1*	5.675 *K1*	9.00 *K1*				
	Geneva Utah		$96.00 *C7*			5.275 *C7*	7.75 *C7*							
	Kansas City, Mo.					5.375 *S2*	7.85 *S2*						8.35 *S2*	
	Los Angeles, Torrance, Cal.		$105.50 *B2*	$134.00 *B2*		5.975 *C7, B2*	8.45 *B2*		5.675 *C7, B2*	9.05 *J3* 9.20 *C1*			9.30 *B2*	17.25 *J3*
	Minnequa, Colo.					5.575 *C6*			6.025 *C6*	9.10 *K1*				
	Portland, Ore.					6.025 *G2*								
	San Francisco, Niles, Pittsburg, Cal.		$105.50 *B2*			5.925 *B2*	8.40 *B2*		5.675 *C7, B2*					
	Seattle, Wash.		$109.50 *B2*			6.025 *B2*	8.50 *B2*		5.925 *B2*					
SOUTH	Atlanta, Ga.					5.475 *A8*			4.925 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$77.50 *T2*	$96.00 *T2*			5.275 *T2, R1,C16*	7.75 *T2*		4.925 *T2, R3,C16*		7.325 *T2*			
	Houston, Lone Star, Texas		$101.00 *S2*	$119.00 *S2*		5.375 *S2*	7.85 *S2*						8.35 *S2*	

(Effective April 28, 1958)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.												
	Buffalo, N. Y.	4.925 *B3*	6.05 *B3*				7.275 *B3*	8.975 *B3*		6.15 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	4.975 *A2*	6.10 *A2*				7.325 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.15 *B3*			
	Fairless, Pa.	4.975 *U1*	6.10 *U1*				7.325 *U1*	9.025 *U1*			$10.15 *U1*	$8.85 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	4.925 *B3*	6.05 *B3*	6.60 *B3*			7.275 *B3*	8.975 *B3*	9.725 *B3*	6.25 *B3*	$10.15 *B3*	$8.85 *B3*	
	Worcester, Mass.									6.45 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.35 *L1*			
	Ashland, Ky	4.925 *A7*		6.60 *A7*	6.625 *A7*								
	Canton-Massillon, Dover, Ohio			6.60 *R3, R1*									
	Chicago, Joliet, Ill.	4.925 *W8, A1*					7.275 *U1*			6.15 *A5, R3, W8, N4, K2*			
	Sterling, Ill.									6.25 *N4, K2*			
	Cleveland, Ohio	4.925 *R3, J3*	6.05 *R3, J3*		6.625 *R3*		7.275 *R3, J3*	8.975 *R3, J3*		6.15 *A5*			
	Detroit, Mich.	5.025 *G3, M2*	6.15 *G3* 6.05 *M2*				7.375 *G3*	9.075 *G3*					
	Newport, Ky	4.925 *A1*	6.05 *A1*										
	Gary, Ind. Harbor, Indiana	4.925 *U1, I3, Y1*	6.05 *U1, I3, Y1*	6.60 *U1, I3*	6.625 *U1, I3, Y1*	7.00 *U1*	7.275 *U1, Y1, I3*	8.975 *U1, Y1*		6.15 *Y1*	$10.05 *U1, Y1*	$8.75 *I3, U1, Y1*	7.50 *U1, Y1*
	Granite City, Ill.	5.125 *G2*	6.25 *G2*	6.80 *G2*	6.825 *G2*							$8.85 *G2*	7.60 *G2*
	Kokomo, Ind.			6.70 *C9*						6.25 *C9*			
	Mansfield, Ohio		6.05 *E2*			7.00 *E2*							
	Middletown, Ohio		6.05 *A7*	6.60 *A7*	6.625 *A7*	7.00 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	4.925 *R3, N3, S1*	6.05 *R3*	6.60 *R3*	6.625 *N3, S1*	7.00 *N3, S1, R3*	7.275 *R3*	8.975 *S1, R3*				$8.75 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa. Donora, Pa. Aliquippa, Pa.	4.925 *U1, J3, P6*	6.05 *U1, J3, P6*	6.60 *U1, J3*	6.625 *U1*		7.275 *U1, J3*	8.975 *U1, J3*	9.725 *U1*	6.15 *A5, J3, P6*	$10.05 *U1, J3*	$8.75 *U1, J3*	7.50 *U1, J3*
	Portsmouth, Ohio	4.925 *P7*	6.05 *P7*							6.15 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.925 *W3, W5*	6.05 *W3, F3, W5*	6.60 *W3, W5*		7.00 *W3, W5*	7.275 *W3*	8.975 *W3*			$10.05 *W5, W3*	$8.75 *W5, W3*	7.50 *W5*
	Youngstown, Ohio	4.925 *U1, Y1*	6.05 *Y1*		6.625 *Y1*		7.275 *Y1*	8.975 *Y1*		6.15 *Y1*			
WEST	Fontana Cal.	5.675 *K1*	7.30 *K1*				8.025 *K1*	10.275 *K1*			$10.80 *K1*	$9.50 *K1*	
	Geneva, Utah	5.025 *C7*											
	Kansas City, Mo.									6.40 *S2*			
	Los Angeles, Torrance, Cal.									6.95 *B2*			
	Minnequa, Colo.									6.40 *C6*			
	San Francisco, Niles, Pittsburgh, Cal.	5.625 *C7*	7.00 *C7*	7.35 *C7*						6.95 *C7*	$10.80 *C7*	$9.50 *C7*	
	Seattle, Wash.												
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	4.925 *T2, R3*	6.05 *T2, R3*	6.60 *T2, R3*	6.625 *T2*					6.15 *T2, R3*	$10.15 *T2*	$8.85 *T2*	
	Houston, Tex.									6.40 *S2*			

(Effective April 28, 1958)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfrs'. Bright
EAST	Bethlehem, Pa.				6.475 *B3*	8.775 *B3*	7.925 *B3*					
	Buffalo, N. Y.	5.425 *R3,B3*	5.425 *R3,B3*	7.35 *B5*	6.475 *B3,R3*	8.775 *B3,B5*	7.925 *B3*	5.10 *B3*		7.20 *B3*		7.65 *W6*
	Claymont, Del.							5.10 *C4*		7.20 *C4*	7.625 *C4*	
	Coatesville, Pa.							5.10 *L4*		7.20 *L4*	7.625 *L4*	
	Conshohocken, Pa.							5.20 *A2*	6.175 *A2*	7.20 *A2*	7.625 *A2*	
	Harrisburg, Pa.							5.10 *P2*	6.275 *P2*			
	Milton, Pa.	5.575 *M7*	5.575 *M7*									
	Hartford, Conn.			7.80 *R3*		9.075 *R3*	7.925 *B3*					
	Johnstown, Pa.	5.425 *B3*	5.425 *B3*		6.475 *B3*			5.10 *B3*		7.20 *B3*	7.625 *B3*	7.65 *B3*
	Fairless, Pa.	5.575 *U1*	5.575 *U1*		6.625 *U1*							
	Newark, N. J. Camden, N. J.			7.75 *W10* 7.75 *P10*		8.95 *W10* 8.95 *P10*						
	Bridgeport, Conn. Putnam, Conn. Willimantic, Conn.			7.85 *W10* 7.80 *J3*	6.55 *N8*	8.925 *N8*						
	Sparrows Pt., Md.		5.425 *B3*					5.10 *B3*		7.20 *B3*	7.625 *B3*	7.75 *B3*
	Palmer, Worcester, Readville, Mass. Mansfield, Mass.			7.85 *B5,C14*		9.075 *A5,B5*						7.95 *A5, W6*
	Spring City, Pa.			7.75 *K4*		8.95 *K4*						
MIDDLE WEST	Alton, Ill.	5.625 *L1*										7.85 *L1*
	Ashland, Newport, Ky.							5.10 *A7,A1*		7.20 *A1*		
	Canton, Massillon, Ohio			7.30 *R3,R2*	6.475 *R3,T5*	8.775 *R3,R2, T5*						
	Chicago, Joliet, Waukegan, Ill. Harvey, Ill.	5.425 *U1,R3, W8,N4,P13*	5.425 *U1,R3, N4,P13*	7.30 *A5, W10,W8 B5,L2,N9*	6.475 *U1,R3, W8*	8.775 *A5, W10,W8 L2,N8,B5*	7.925 *U1,W8*	5.10 *U1,A1, W8,I3*	6.175 *U1*	7.20 *U1,W8*	7.625 *U1,W8*	7.65 *A5,R3, W8,N4, K2,W7*
	Cleveland, Ohio Elyria, Ohio	5.425 *R3*	5.425 *R3*	7.30 *A5,C13 C18*		8.775 *A5, C13, C18*	7.925 *R3*	5.20 *R3,J3*	6.175 *J3*		7.625 *R3, J3*	7.65 *A5, C13*
	Detroit, Mich.	5.525 *G3*	5.775 *G3*	7.55 *P3* 7.50 *P8,B5*	6.475 *R5* 6.575 *G3*	8.775 *R5* 8.975 *B5,P3, P8*	8.025 *G3*	5.20 *G3*		7.35 *G3*		
	Duluth, Minn.											7.65 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.425 *U1,I3, Y1*	5.425 *U1,I3, Y1*	7.30 *R3,J3*	6.475 *U1,I3, Y1*	8.775 *R3,M4*	7.925 *U1, Y1*	5.10 *U1,I3, Y1*	6.175 *J3,I3*	7.20 *U1,Y1*	7.625 *U1, Y1,I3*	7.75 *M4*
	Granite City, Ill.							5.30 *G2*				
	Kokomo, Ind		5.525 *C9*									7.75 *C9*
	Sterling, Ill.	5.525 *N4*	5.525 *N4*					5.10 *N4*				7.75 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.30 *C10*	6.475 *C10,S1*	8.775 *C10*	7.925 *S1*	5.10 *R3,S1*		7.20 *S1*	7.625 *R3, S1*	
	Owensboro, Ky.	5.425 *G5*			6.475 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.425 *U1,J3*	5.425 *U1,J3*	7.30 *A5,B4, R3,J3,C11, W10,S9,C8*	6.475 *U1,J3, C11,B7*	8.775 *A5, W10,R3,S9, C11,C8*	7.925 *U1,J3*	5.10 *U1,J3*	6.175 *U1*	7.20 *U1,J3, B7*	7.625 *U1,J3, B7*	7.65 *A5, J3,P6*
	Portsmouth, Ohio											7.65 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.10 *W5*				
	Youngstown, Ohio	5.425 *U1,R3, Y1*	5.425 *U1,R3, Y1*	7.30 *A5,Y1, F2*	6.475 *U1,Y1*	8.775 *Y1,F2*	7.925 *U1,Y1*	5.10 *U1,R3, Y1*		7.20 *Y1*	7.625 *U1, R3,Y1*	7.65 *Y1*
WEST	Emeryville, Cal. Fontana, Cal.	6.175 *J5* 6.125 *K1*	6.175 *J5* 6.125 *K1*		7.525 *K1*		8.625 *K1*	5.90 *K1*		8.00 *K1*	8.425 *K1*	
	Geneva, Utah							5.10 *C7*			7.625 *C7*	
	Kansas City, Mo.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*					7.90 *S2*
	Los Angeles, Torrance, Cal.	6.125 *C7,B2*	6.125 *C7,B2*	8.75 *R3,P14*	7.525 *B2*	10.75 *P14*	8.625 *B2*					8.60 *B2*
	Minnequa, Colo.	5.875 *C6*	5.875 *C6*					5.95 *C6*				7.90 *C6*
	Portland, Ore.	6.175 *O2*	6.175 *O2*									
	San Francisco, Niles, Pittsburg, Cal	6.125 *C7* 6.175 *B2*	6.125 *C7* 6.175 *B2*				8.675 *B2*					8.60 *C7,C6*
	Seattle Wash.	6.175 *B2,N6*	6.175 *B2*				8.675 *B2*	6.00 *B2*		8.10 *B2*	8.525 *B2*	
SOUTH	Atlanta, Ga.	5.625 *A8*	5.425 *A8*									7.65 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	5.425 *T2,R3, C16*	5.425 *T2,R3, C16*	7.90 *C16*			7.925 *T2*	5.10 *T2,R3*			7.625 *T2*	7.65 *T2,R3*
	Houston, Ft. Worth, Lone Star, Tex.	5.675 *S2*	5.675 *S2*		6.725 *S2*		8.175 *S2*	5.20 *S2* 5.20 *L3*		7.30 *S2*	7.725 *S2*	7.90 *S2*

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Dearborn Div., Sharon Steel Corp.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 J. & L. Steel Co., Stainless Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Youngstown *R3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fontana *K1*	+8.25	+23.5	+5.25	+19.5	+1.75	+15.00	0.75	+14.25	1.25	+13.25	1.75	+12.75	3.25	+13.00								
Pittsburgh *J3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Alton, Ill. *L1*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Sharon *M3*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Fairless *N2*	3.25	+12.0	6.25	+8.0	9.75	+3.50	12.25	+2.75	12.75	+1.75	13.25	+1.25	14.75	+1.50								
Pittsburgh *N1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Wheeling *W5*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Wheatland *W4*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50								
Youngstown *Y1*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
Indiana Harbor *Y1*	4.25	+11.0	7.25	+7.0	10.75	+2.50	13.25	+1.75	13.25	+0.75	14.25	+0.25	15.75	+1.00								
Lorain *N2*	5.25	+10.0	8.25	+6.0	11.75	+1.50	14.25	+0.75	14.75	0.25	15.25	0.75	16.75	0.50	*9.25	+24.25	*2.75	+19.50	*0.25	+17.0	1.25	+15.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Youngstown *R3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Fairless *N2*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Fontana *K1*	+3.75		0.25		3.25		3.75		4.25		4.75		5.25									
Pittsburgh *J3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Alton, Ill. *L1*	7.75	+6.0	11.75	+2.0	14.75	2.50	15.25	1.25	15.75	2.25	16.25	2.75	16.75	1.50								
Sharon *M3*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Pittsburgh *N1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Wheeling *W5*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Wheatland *W4*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50								
Youngstown *Y1*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50
Indiana Harbor *Y1*	8.75	+5.0	12.75	+1.0	15.75	3.50	16.25	2.25	16.75	3.25	17.25	3.75	17.75	2.50								
Lorain *N2*	9.75	+4.0	13.75	list	16.75	4.50	17.25	3.25	17.75	4.25	18.25	4.75	18.75	3.50	*7.75	+21.75	*0.25	+16.0	2.25	+13.50	7.25	+8.50

Threads only, buttweld and seamless 2½ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ⅜, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower d'counts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 10¢ per lb.

(Effective April 28, 1958)

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
¼" and smaller x 6" and shorter	49	54	56	57
5/16" thru 1" x longer than 6"	35	40	43	45
Rolled thread carriage bolts ½" & smaller x 6" and shorter	49	54	56	57
Lag, all diam. x 6" & shorter	49	54	56	57
Lag, all diam. longer than 6 in.	39	44½	47	48½
Plow bolts, ½" and smaller x 6" and shorter	49	54	56	57

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
¾ in. or smaller	60½
⅞ in. to 1 in. inclusive	55½
1⅛ in. to 1½ in. inclusive	58½
1⅝ in. and larger	53½
C. P. Hex, reg. & hvy.	
¾ in. and smaller	60½
⅞ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½
Hot Galv. Hex Nuts (All Types)	
¾ in. and smaller	46½
Semi-finished Hex Nuts	
⅝ in. or smaller	60½
¾ in. to 1½ in. inclusive	55½
1⅝ in. and larger	53½

(Add 25 pct for broken case or keg quantities)

Finished

⅞ in. and smaller 63

Rivets

	Base per 100 lb
½ in. and larger	$12.25
	Pct. Off List
7/16 in. and smaller	19

Cap Screws

Discount (Packages)

	Full Finished H. C. Heat Treat	
New std. hex head, packaged		
⅝" diam. and smaller x 6" and shorter	40	26
¾", ⅞", and 1" diam. x 6" and shorter	22	3
⅝" diam. and smaller x longer than 6"	8	+13
¾", ⅞", and 1" diam. x longer than 6"	+ 6	+32
		C-1018 Steel Full-Finished Cartons Bulk
¼" through ⅝" dia. x 6" and shorter	58	49
⅝" through 1" dia. x 6" and shorter	45	33

Minimum quantity—¼" through ⅝" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Plain Finish Cartons		60	60
Bulk	*Quantity*		
To ¼" diam. incl.	25,000-and over	60	..
5/16 to ½" diam. incl.	15,000-200,000	60	..

Machine Screws & Stove Bolt Nuts

		Discount Hex	Square
In Cartons		16	19
In Bulk	*Quantity*		
⅝" diam. & smaller	25,000 and over	14	16

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.7
Chicago	140.9
San Francisco-L. A.	148.6

Dec. 1955. value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	40.00
Electrodeposited	31.25
Brass, 80-20, ball anodes, 2000 lb or more	44.00
Zinc, ball anodes, 2000 lb lots	16.50
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.0225
(Rolled depolarized add 3¢ per lb)	
Cadmium	1.55
Tin, ball anodes $1.13 per lb (approx.).	

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	68.70
Copper sulphate, 100 lb bags, per cwt.	22.15
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	48.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	24.05
(Philadelphia price 24.50)	
Zinc cyanide, 100 lb	60.75
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 10,000 lb or more	31.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots for minus 100 mesh

Swedish sponge iron, del. East of Miss. River, ocean bags, 23,000 lb. and over	10.5¢
F.O.B. Riverton or Camden, New Jersey, west of Miss. River	9.5¢
Domestic sponge iron, 98+% Fe, 23,000 lb. and over del'd East of Miss. River	10.5¢
F.O.B. Riverton, New Jersey, West of Miss. River	9.5¢
Canadian sponge iron, del'd in East, carloads	10.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	27.0¢
Carbonyl iron size 3 to 20 micron, 98%, 99.8+% Fe	88.0¢ to $2.85
Aluminum, freight allowed	38.00¢
Brass, 10 ton lots	31.1¢ to 47.1¢
Copper, electrolytic	41.50¢
Copper, reduced	40.3¢ to 48.8¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic, 99.85% min. Fe. 03 max. Del'd	$5.00
Lead	21.50¢ lb, f.o.b. plant
Manganese f.o.b. Extron, Pa.	46.0¢
Molybdenum, 99%	$3.60 to $3.95
Nickel, chemically precipitated	$1.05
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed ±80	$1.13
Silicon	43.50¢
Solder powder	13¢ plus met. value
Stainless steel, 302	$1.02
Stainless steel, 316	$1.30
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh) $3.15 (nominal)	
Zinc, 5000 lb & over	17.5¢ to 30.7¢

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets: Hot-Rolled (18 ga. & hvr.)	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)††	Strip: Hot-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled (merchant)	Bars: Cold-Finished	Alloy Bars: Hot-Rolled 4615 As rolled	Alloy Bars: Hot-Rolled 4140 Annealed	Alloy Bars: Cold-Drawn 4615 As rolled	Alloy Bars: Cold-Drawn 4140 Annealed
Atlanta		8.59	9.87	10.13	8.64	8.97	9.05	9.01	10.68	.....	.....	.....	.....
Baltimore	$.10	8.38	8.98	9.78	8.86	8.76	9.29	9.16	10.69*	16.28	15.28	19.83	19.08
Birmingham	.15	8.18	9.45	10.15	8.23	8.56	8.64	8.60	10.57	.....	.....	.....	.....
Boston	.10	9.48	10.54	11.55	9.52	9.82	9.73	9.83	13.00	16.38	15.38	19.93	19.18
Buffalo	.15	8.48	9.15	11.22	8.65	9.05	9.05	8.95	11.05*	16.24	15.15	19.01	18.95
Chicago	.15	8.35	9.60	10.25	8.38	8.71	8.79	8.75	8.95	15.80	14.80	19.35	18.60
Cincinnati	.15	8.49	9.65	10.25	8.69	9.08	9.33	9.07	9.46	15.61	15.11	18.96	18.91
Cleveland	.15	8.33	9.60	10 35	8.48	8.94	9.16	8.84	10.95*	15.89	14.89	19.29	18.69
Denver	.20	9.70	11.30	12.49	9.80	9.70	9.80	9.98	10.65	.....	.....	.....	17.60
Detroit	.15	8.58	9.85	10.60	8.73	9.06	9.33	9.05	9.30	15.46	15.06	18.81	18.86
Houston		7.10	8.05	.....	7.25	8.05	7.25	7.20	11.10	16.20	15.25	19.65	18.95
Kansas City	.20	9.02	10.27	10 82	9.05	9.38	9.46	9.42	9.87	20.02	15.47	20.02	19.27
Los Angeles	.10	9.70**	9.50	11.00	8.65	8.65	8.70	8.80	12.10*	17.05	16.10	21.05	20.35
Memphis	.15	8.55	9.80	.....	8.60	8.93	9.01	8.97	12 11*	.....	.....	.....	.....
Milwaukee	.15	8.48	9.73	10.38	8.51	8.84	9.00	8.88	9.18	15.93	14.93	19.48	18.73
New York	.10	8.97	10.23	10.66	9.41	9.53	9.45	9.67	12.86*	16.19	15.19	19.74	18.99
Norfolk	.20	8.20	.....	.....	8.98	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	8.10	9.00	10.02	8.79	8.87	8.60	8.75	11.61*	16.11	15.11	19.66	18.91
Pittsburgh	.15	8.33	9.60	10.60	8.48	8.71	8.79	8.75	10.95*	15.80	14.80	19.35	18.60
Portland		10.00[1]	11.75[2]	13.30[3]	11.95[4]	10.10[5]	11.10[6]	9.85[7]	11.34*	18.50	17.45	20.75	20.25
San Francisco	.10	9.45	10.85	11.10	9.55	9.70	9.60	9.80	13.10	17.05	16.10	21.05	20.35
Seattle		9.95	11.15	12.20	10.00	9.70	9.80	10.10	14.05	17.15	16.35	20.65	20.15
Spokane	.15	10.10	11.30	12.15	10.15	9.85	9.95	10.25	14.20	.....	17.35	21.55	21.05
St. Louis	.15	8.69	9.94	10.61	8.74	9.08	9.25	9.12	9.56	16.16	15.16	19.71	18.96
St. Paul	.15	8.94	10.19	10.86	8.99	9.45	9.53	9.37	9.81	.....	15.41	.....	19.21

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **All sizes except 18 and 16 gage.

†† 10¢ zinc. ‡ Deduct for country delivery. * C1018—1 in. rounds. [1] 10 ga. x 36" x 120"; [2] 20 ga. x 36" x 120"; [3] 26 ga. x 30" x 96"; [4] ⅛" x 1" in lots of 1000 to 9999; [5] sheared plate ¼" x 84" in lots of 1000 to 9999; [6] 3" x 5.70" in lots of 1000 to 9999; [7] M-1020—1-in. rounds in lots of 1000 to 9999.

(Effective April 28, 1958)

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.795	T-1
18	4	1	—	5	2.50	T-4
18	4	2	—	—	1.96	T-2
1.5	4	1.5	8	—	1.155	M-1
6	4	3	6	—	1.545	M-3
6	4	2	5	—	1.30	M-2
High-carbon chromium					.925	D-3, D-5
Oil hardened manganese					.475	O-2
Special carbon					.36	W-1
Extra carbon					.36	W-1
Regular carbon					.305	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4, C4*) 10 pct	Plate (*A3, J2, L4, C4*) 15 pct	Plate (*A3, J2, L4, C4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	37.95	42.25	46.70	40.00
	316	44.40	49.50	54.50	58.75
	321	40.05	44.60	49.30	47.25
	347	42.40	47.55	52.80	57.00
	405	29.85	33.35	36.85	.....
	410	29.55	33.10	36.70	.....
	430	29.80	33.55	37.25	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 38.75; 1 side, 33.10.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.525	6.50	6.975	.....	.....	.....	14.75
Cleveland *R3*	.....	.....	.....	.....	.....	.....	.....
So. Chicago *R3*	.....	.....	.....	9.75	.....	.....	.....
Ensley *T2*	5.525	6.50	.....	.....	.....	.....	.....
Fairfield *T2*	.....	6.50	.....	9.75	.....	6.60	.....
Gary *U1*	5.525	.....	.....	.....	.....	6.60	.....
Huntington *C16*	.....	6.50	.....	.....	.....	.....	.....
Ind. Harbor *I3*	5.525	.....	6.975	9.75	.....	6.60	.....
Ind. Harbor *Y1*	.....	.....	.....	9.75	.....	.....	.....
Johnstown *B3*	.....	6.50	.....	.....	.....	.....	.....
Joliet *U1*	.....	.....	6.975	.....	.....	.....	.....
Kansas City *S2*	.....	.....	.....	9.75	.....	.....	14.75
Lackawanna *B3*	5.525	6.50	6.975	.....	.....	6.60	.....
Lebanon *B3*	.....	.....	6.975	.....	14.50	.....	14.75
Minnequa *C6*	5.525	7.00	6.975	9.75	.....	6.60	14.75
Pittsburgh *P5*	.....	.....	.....	.....	.....	.....	14.75
Pittsburgh *J3*	.....	.....	.....	9.75	.....	.....	.....
Seattle *B2*	.....	.....	.....	10.25	.....	6.75	15.75
Steelton *B3*	5.525	.....	6.975	.....	.....	6.60	.....
Struthers *Y1*	.....	.....	.....	9.75	.....	.....	.....
Torrance *C7*	.....	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.50	.....	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	9.75	.....	.....	.....

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$15.00 to $15.75
Foundry, beehive (f.o.b.)	$17.50 to $19.00
Foundry oven coke	
Buffalo, del'd	$31.75
Detroit, f.o.b.	30.50
New England, del'd	31.55
Kearney, N. J., f.o.b.	29.75
Philadelphia, f.o.b.	29.50
Swedeland, Pa., f.o.b.	29.50
Painesville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, del'd	32.65
Cincinnati, del'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Neville, Is., Pa.	29.25

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1958 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	....	9.625	....
Armature	11.10	10.85	11.35
Elect.	11.80	11.55	12.05
Special Motor	....	12.10	....
Motor	12.90	12.65	13.15
Dynamo	13.95	13.70	14.20
Trans. 72	15.00	14.75	15.25
Trans. 65	15.55		
		Grain Oriented	
Trans. 58	16.05	Trans. 66	20.20
Trans. 52	17.10	Trans. 80	19.20
		Trans. 73	19.70

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I5*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*N5*); Vandergrift (*U1*); Warren, O. (*R5*); Zanesville, Butler (*A7*).

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	25.00	40	100, 110	10.70
20	72	25.25	35	110	10.70
18	72	25.75	30	110	10.85
14	72	25.75	24	72 & 84	11.25
12	72	26.25	20	90	11.00
10	60	28.00	17	72	11.40
10	48	28.50	14	72	11.85
7	60	28.25	12	60	12.95
6	60	31.50	10	60	13.00
4	40	35.00	8	60	13.30
3	40	37.00			
2½	30	39.25			
2	24	60.75			

* Prices shown cover carbon nipples.

REFRACTORIES

Fire Clay Brick

Carloads per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$135.00
No. 1 Ohio	120.00
Sec. Quality, Pa., Md., Ky., Mo., Ill.	120.00
No. 2 Ohio	103.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00)	21.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$150.00
Childs, Hays, Pa.	155.00
Chicago District	160.00
Western Utah	175.00
California	180.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	157.00-160.00
Silica cement, net ton, bulk, Latrobe	28.50
Silica cement, net ton, bulk, Chicago	25.50
Silica cement, net ton, bulk, Ensley, Ala.	26.50
Silica cement, net ton, bulk, Mt. Union	24.50
Silica cement, net ton, bulk, Utah and Calif.	37.00

Chrome Brick

Per net ton

Standard chemically bonded, Balt.	$105.00
Standard chemically bonded, Curtiner, Calif.	115.00
Burned, Balt.	99.00

Magnesite Brick

Standard Baltimore	$131.00
Chemically bonded, Baltimore	116.00

Grain Magnesite

St. ⅝ to ⅛-in. grains

Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

Per net ton

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	$16.75
Midwest	17.00
Missouri Valley	15.00

(Effective April 28, 1958)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	....	212	193	8.65	9.20
Aliquippa *J3***	173	190	....	....	190	8.65	9.325
Atlanta *A8***	175	192	....	214	198	8.75	9.425
Bartonville *K2***	175	192	178	214	198	8.75	9.425**
Buffalo *W6*	....	....	....	....	....	8.65	8.95*
Chicago *N4*****	173	190	172	212	196	8.65	9.325
Cleveland *A6*	....	....	....	....	....	....	....
Cleveland *A5*	....	....	....	....	....	8.65	....
Crawf'dsv. *M4***	175	192	....	214	198	8.75	9.425
Donora, Pa. *A5*	173	187	....	212	193	8.65	9.20
Duluth *A5*	173	187	....	212	193	8.65	9.20
Fairfield, Ala. *T2*	173	187	....	212	193	8.65	9.20
Galveston *D4*	9.10‡	....	....	....	....	....	....
Houston *S2*	178	192	....	217	198	8.90	9.45
Jacksonville *M4*	184-1	197	....	219	203	9.00	9.675
Johnstown *B3***	173	190	172	....	196**	8.65	9.325**
Joliet, Ill. *A5*	173	187	....	212	193	8.65	9.20
Kokomo *C9**	175	189	....	214	195*	8.75	9.30*
L. Angeles *B2****	....	....	....	....	....	9.60	10.275
Kansas City *S2**	178	192	....	217	198*	8.90	9.45*
Minnequa *C6*†*	178	192	177	217	198†	8.90	9.45†
Monessen *P6*	....	....	....	....	193	8.65	9.20
Palmer, Mass. *W6*	....	....	....	....	....	8.95	9.50*
Pittsburg, Cal. *C7*	192	210	....	....	213	9.60	10.15
Rankin, Pa. *A5*	173	187	....	....	193	8.65	9.20
So. Chicago *R3*	173	187	....	....	193	8.65	9.20
S. San Fran. *C6*†	....	....	....	236	....	9.60	10.15†
Sparrows Pt. *B3***	175	....	....	214	198	8.75	9.425
Sterling, Ill. *N4*****	175	192	172	214	198	8.75	9.425
Struthers, O. *Y1**	....	....	....	....	....	8.65	9.30
Worcester *A5*	179	....	....	....	....	8.95	9.50
Williamsport *S5*	....	....	....	....	....	....	....

* Zinc less than .10¢.
** 11-12¢ zinc.
*** 10¢ zinc.
† Plus zinc extras.
‡ Wholesalers only.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Baltimore, Md. *T8*	9.50	10.70	12.90	15.10	18.85
Bristol, Conn. *W12*	....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	....	....
Detroit *D1*	9.05	10.50	12.70	15.70	....
Detroit *D2*	9.05	10.50	12.70	....	....
Dover, O. *C4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	....	....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	....	....	12.90	16.10	19.30
Indianapolis *J3*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	....
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Pittsburgh *S7*	8.95	10.40	12.60	15.60	18.55
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	....	10.70	12.90	16.10	19.30
Wallingford *W1*	9.40	10.70	12.90	15.90	18.55
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *J3*	8.95	10.40	12.60	15.60	18.55

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD. In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
Babcock & Wilcox	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
National Tube	2	13	36.34	42.56	35.22
	2½	12	48.94	57.31	47.43
	3	12	56.51	66.18	54.77
	3½	11	65.97	77.25	63.93
	4	10	87.61	102.59	85.53
Pittsburgh Steel	2	13	36.34	42.56	.....
	2½	12	48.94	57.31	.....
	3	12	56.51	66.18	.....
	3½	11	65.97	77.25	.....
	4	10	87.61	102.59	.....

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	.....
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R5*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	.....
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	66.50	67.00	67.50	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66 50	67.00	67.50	.....
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	.....
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	74.00
Youngstown *Y1*	.....	.....	66.50	67.00	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4* (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $103.50; (15.51-16.00), $106.50. Add $1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add $1.25 for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

STAINLESS STEEL

Base price cents per lb f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.00	23.75	23.25	25.25	—	27.00	39.75	32.25	37.00	—	16.75	—	17.00
Slabs, billets	27.00	27.00	28.00	31.50	32.00	33.25	49.50	40.00	46.50	—	21.50	—	21.75
Billets, forging	—	36.50	37.25	38.00	41.00	40.50	62.25	47.00	55.75	32.00	28.25	28.75	28.75
Bars, struct.	42.00	43.00	44.25	45.00	48.00	47.75	73.00	55.50	64.75	37.75	33.75	34.25	34.25
Plates	44.25	45.00	46.25	47.25	50.00	50.75	76.75	59.75	69.75	40.25	35.00	36.75	36.00
Sheets	48.50	49.25	51.25	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	—	55.00	80.75	65.50	79.25	48.25	40.25	—	40.75
Wire CF; Rod HR	40.00	40.75	42.00	42.75	45.50	45.25	69.25	52.50 52.75	61.50	35.75	32.00	32.50	32.50

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2*, *J2*, Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R5*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*, McKeesport, Pa., *F1*; Reading, Pa., *C2*, Washington, Pa., *W2*; W. Leechburg, Pa., *A3*, Bridgeville, Pa., *U2*; Detroit, *M2*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *J3*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*; Gary, *U1* (.25¢ per lb higher).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*, Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1* Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*, S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*, *R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owenboro, Ky., *G5*; Bridgeport, Conn., *N8*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown; *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R5*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*.

(Effective April 28, 1958)

MACLEOD

BLAST CLEANING EQUIPMENT

•

NEW!

HIGH-SPEED

"Rapid-Blast"

MACLEOD

Blast Cleaning Cabinet

•

The Brand New Type AL "Rapid-Blast" Cabinet is specifically designed for high rate of continuous automatic production. Also a complete line of rooms, machines and dust arresters. Over 60 years experience designing and building special equipment. Write for descriptive literature on MACLEOD Blast Cleaning Rooms, Cabinets, and Machines.

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"C" Steel Castings possess many qualities other than the strength of steel. They provide for more freedom and efficiency of design, better weight-strength ratio and greater fatigue resistance, i.e., longer life and less replacement. "C" Steel Castings

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CRUCIBLE STEEL CASTING CO.

LANSDOWNE 1, PENNA.

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25

4.00-4.50% C, 60-70% Cr, 1-2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 27.50
0.025% C (Simplex) 36.75
0.10% C, 52-57% Cr, 2.00% max Si. 37.50
7-8½% max C, 50-55% Cr, 3-6% max Si 22.50
7-8½% max C, 50-55% Cr, 3% max Si 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.31
0.50% max. C	1.31
9 to 11% C, 88-91% Cr, 0.75% Fe...	1.40

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.29
Ton lots	1.31
Less ton lots	1.33

Low Carbon Ferrochrome Silicon

(Cr 34-41%; Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads	27.50	14.20
Ton lots	32.75	15.65
Less ton lots	34.35	17.30

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Ca, 60-65% Si, 3.00 max. Fe.

Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5: 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	12.25
Johnstown, Pa.	12.25
Neville Island, Pa.	12.25
Sheridan, Pa.	12.25
Philo, Ohio	12.25
S. Duquesne	12.25

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:	
Carloads, bulk	14.80
Ton lots packed in bags	17.20

Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$106.50
19 to 21%	3% max.	102.50
21 to 23%	3% max.	105.00

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	34.00
Ton lots	36.00
250 to 1999 lb	38.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 25.50

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton (Bulk)	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	33.60	36.40	37.60
0.30% max. C	32.10	34.90	36.10
0.50% max. C	31.60	34.40	35.60
0.75% max. C, 80-85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carloads bulk	12.80
Ton lots, packed	14.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed, pallets	16.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots, packed	Carloads, packed
96.75% Si, 1.25% Fe..	24.20	22.90
98% Si, 0.75% Fe	24.95	23.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	7.70
Ton lots, packed	10.50

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.20	75% Si....	16.40
65% Si....	15.25	85% Si....	18.10
	90% Si....	19.50	

Ferrovanadium

50-55% V delivered, per pound, contained V, carloads, packed.

Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 9999 lb..	2.40	3.30	4.55

(Effective April 28, 1958)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk	10.35¢
Ton lots	11.70¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.28

Ferrocolumbium, 50-50%, 2 in. x D, delivered per pound contained Cb.

Ton lots	$4.00
Less ton lots.....	4.05

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Sb plus Ta $3.80

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $240.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 ..... $1.38

Zirconium, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed	27.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Bortram, f.o.b. Niagara Falls.

Ton lots per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 14.00¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots... $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19%	1.20
19% min. B	1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed)	$1.46
Less ton lots (packed)	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

REBUILT — GUARANTEED ELECTRICAL EQUIPMENT

SYNCHRONOUS MOTORS
3-Phase—60 Cycle

Qu.	HP	Make	P.F.	Volts	R.P.M.
1	1750	G.E.	100	2200	3600
1	1500	G.E.	80	4150/2400	900
1	1500	Whse.	80	2300	514
3 (new)	1450	Whse.	80	1160	450
1	920	G.E.	80	2200/440	300
1	700	El. Mchy.	100	440	500
1	450	Whse.	100	2300	128
3	350	G.E.	100	2300	900
1	300	Whse.	80	2300	900
1	300	G.E.	100	2300/440	720
1	300	G.E.	800	2200/440	600
1	200	Al. Ch.	100	2200	514
1	208	Al. Ch.	100	2300/440	300

SLIP RING MOTORS
Constant Duty—3 Phase, 60 Cycle

Qu.	HP	Make	Type	Volts	R.P.M.
1	1800	Whse.	CW	2300	272
8	1500	G.E.	MT	6900/4160	441
1	600	G.E.	TM	2300	252
2	500	Al. Ch.	ARY	2300	505
1	500	G.E.	T-M	2300	450
1	400	Al. Ch.	ARY	2300	505
1	400	Whse.	CW	2300	290
1	350	G.E.	1P15R	2200	1180
1	350	G.E.	MT-412	2200	150
1	300	Whse.	CW-1012	2200	720
1	300	G.E.	T-M	440	1200
1	250	Al. Ch.	ARY	440	745
1	250	Whse.	CW	4160/2300	720
1	250	G.E.	T-M	550	450
1	250	G.E.	MT-414	2200	300

Westinghouse Net Work unit with network protector, 500-KVA, 3 phase, 60 cycle transformer 13,200/11,880-120/208-Volts with throat connected primary disconnect switch both inertean filled with throat connected protector cubicle having following 3-pole air circuit breakers, all with (3) overloads —(1) 1600 amps. motor operated drawout breaker (2) 800 amps. manual operated breakers, (8) 225 amps. manual breakers.

OUTDOOR OIL CIRCUIT BREAKERS
3-Pole—Electrically Operated

Qu.	Amps.	KV	Make	Type	Int. Cap.
1	400	73	Whse.	G-11	500-MVA
1	600	69	G.E.	FK-339	500-MVA
1	600	37	G.E.	FHKO-236	500-MVA
1	600	34.5	Al.Ch.	FZO-50-34X	250-MVA
1	400	37	G.E.	FHKO-136	250-MVA
1	400	15	G.E.	FHKO-136	500-MVA
1	600	14.4	G.E.	FLO-14.4-4	250-MVA

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CIRCUIT BREAKERS In Stock

1—600 a.—15000 V—F100—100 MVA. I.C. in cubicle. 24x50x114. Sol. 250 V.

3—600 a.—15000 V—F-100—100 MVA. I.C. in cubicle—36x54x116—manual.

1—600 a.—15000 V—B-20-B 150 MVA. I.C. Draw out cubicle—Sol. operated. Many others.

For listings of Motors, Generators, Transformers, M-G Sets, Rectifiers, Mill Motors, etc., See last week issue.

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Economy Drives Block Philadelphia Sales

Used machinery business slow as dealers have trouble converting inquiries into sales.

Buyers often postpone getting needed equipment until conditions improve.

■ "We count on going forward—in a slow way," says a used machinery dealer in the Delaware Valley Area.

"Nobody's lining up at your door," another comments. "But there are some sales around if you work to land them."

"Closing deals is tough," a third adds. "I usually leave around seven in the morning to start my sales day."

Need, But No Sale — Capsule summaries of the market by other dealers are "quiet," "slow," and "spotty." None of them sees much improvement, if any, during the second quarter. Three factors are pointed out as contributing to the slowdown: (1) lack of buyer confidence, (2) tight money, and (3) economy moves by top management.

"A lot of times there's a critical need for new machines," says one dealer. "Plant supervisors are ready to buy but management won't loosen up on the purse-strings."

Lots of Foot Dragging—Another equipment supplier reports on a case of buying shyness that put a lot of his work down the drain. The prospect, a large company, was interested in two lathes worth $38,000. The deal hung fire for a month while various leasing and financing arrangements were discussed. Finally a decision came through: "We'll wait until later in the year before buying."

While actual sales are slow, the level of inquiries is still high. "My inquiry rate is higher than I can remember," a seller points out. "The trouble is translating them into sales." Wondering what happens when the sales don't materialize he reasons this way: Those inquiring are bidding on contracts which would require enlarging productive capacity. When they don't get the job, they don't buy the machines.

Smaller Shops Inquiring — One aspect of the inquiry activity is cheering some dealers. Represented again are some of the smaller job shops. Dealers point out that these customers are among the first to leave the market and the last to return.

As expected, the slower pace of the market has forced prices down. But those paid at auctions are still surprising. One dealer recently arranged an auction sale for a client. Before the sale he reviewed the equipment, estimated it would bring $60,000. The actual sale, however, brought in $72,000.

Little Buying for Stock — Used machinery supplies are plentiful, the dealers indicate. But few are doing any buying for stock. Their inventories are high and they are feeling the pinch as much as their customers.

At the moment there are no really "good movers" on the market. The sales made are usually for standard toolroom and production machinery. And both of these lines are slow.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLL
3 x 3 x ⅜" Buffalo No. 1 Angle Bending Roll
BALER
Model #122-PX-60 Logemann, Baling Chamber 60 x 14 x 18"
BENDER & STRAIGHTENER
Pels Type JH All Steel Bender & Straightener for Beams, Channels, Angles, Tees—Angles Equal & Tees 8 x 8 x 1⅛"
BENDING ROLLS
8' x ¼" Bertsch Initial Type
10' x ⅛" King Pyramid Type
12' x 5/16" Bertsch Initial Type
18' x 1" Niles Pyramid Type
BRAKE—PRESS TYPE
10' x ¼" & 12' x ¼" Hydraulic—NEW
CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton	P&H	56' Span 220/3/60
5 ton	Shepard Niles	70' Span 230 Volt D.C.
7½ ton	Shaw	49' Span 230 Volt D.C.
8 ton	P&H	55' Span 220/3/60
10 ton	P&H	39' Span 230 Volt D.C.
10 ton	Shaw	48' Span 230 Volt D.C.
10 ton	P&H	52' Span 250 Volt D.C.
10 ton	Shaw	120' Span 230 Volt D.C.
15 ton	Northern	54' Span 230 Volt D.C.
15 ton	Shepard Niles	56' Span 230 Volt D.C.
20 ton	Shepard Niles	88' Span 250 Volt D.C.
20 ton	P&H	100' Span 250 Volt D.C.
120 ton	Shepard Niles	77' Span 230/3/60

DRAW BENCH
10,000# Aetna Standard Single Draw 44 Ft. Length of Draw
FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine
FORGING MACHINES
1" to 5" Acme, Ajax, National
FURNACE—MELTING
15 ton Heroult Top Charge, 12' Shell
HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING 800 lb. to 12,000 lb. incl.
LEVELERS—ROLLER
37" Torrington, 19 Rolls 1 31/32" dia.
44" Newbold, 9 Rolls 4" dia.
60" Aetna Standard, 17 Rolls 4¾" dia.
PLATE DUPLICATOR
No. 12 Thomas Single End, Punch Capacity 150 tons Table Area for handling 5' x 16' Plates
PRESSES—HYDRAULIC
600 ton HPM Fastraverse, Bed 36" x 36"
600 ton Elmes, 36" Stroke, 48x45" Bet. Cols.
1500 ton Bliss 15"-Stroke, Bed 49" x 48"
1500 ton Mesta Steam Hydr. Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press
PRESSES—STRAIGHT SIDE
180 ton Hamilton #847, 12" Str. 35½" Bet. Ups.
200 ton Clearing F1200-42, Stroke 30", Bed 44"x38"
250 ton Bliss SI 7½ Str. Blstr. 33"x39"
PUNCH & SHEAR COMBINATIONS
Cleveland Style C; Arch Jaw, Capy. ⅝" x ⅝"
Cleveland Style EF, Arch Jaw, Capy. 1¼" x 1"
TORRINGTON FLAT WIRE MILL LINE
Two Stand Two High 6" x 5", Comp. with Acc.
ROLLING MILLS
6" x 1" Three Stand Wire, Rolling Mill Complete with Pay Off & Recoiler
8" x 10" Single Stand Two High
10" x 14" Single Stand Two High
10" x 16" Single Stand Two High
12" x 12" Single Stand Two High
12" x 16" Single Stand Two High
16" x 24" Single Stand Two High
20" x 36" Single Stand Two High
ROLLS—FORMING
6 Stand Yoder M-1¼
18 Stand Custom Built, 2½" Shaft, will take 36" wide
ROLLS—PLATE STRAIGHTENING
108" Bertsch, Seven Rolls 9" Dia.
72" Niles 7 Rolls 9" Dia. Motor Driven
SHEAR—ALLIGATOR
No. 4 Mesta RH LK, Capacity 2" x 12"
SHEAR—ANGLE
6 x 6 x ⅝" Hilles & Jones
SHEAR LINES
36" x .020 Ga. Halden Shear Line
42" Bliss Up-Cut Shear, Capacity .125" Max.
SHEAR—ROTARY
#750 Kling, 48" Throat, ¾" Capacity—LATE
SHEARS—SQUARING
6' x 14 Ga. Edwards, Motor Drive LATE
10' x ⅜" Bertsch
14 x 3/16" Cincinnati #1814
SLITTERS
36" Wean Slitting Line
48" Wean Slitting Line
STRAIGHTENERS
24" Halden Straightening & Cutting Machine
¼" Shuster with 12' Cut Off, M.D.
Torrington 12-Roll Capy. 1⅜" Sq. Etc.
No. 0 Medart 2 Roll, Capacity ⅛"-1½" Bars
No. 3 Medart 3 Roll, Capacity to 4½" Tubing
SWAGING MACHINES
#6½A Fenn Capacity 3⅝" Tube, 1¼" Solid
10" Die Length Hydraulic Feed, LATE
WIRE DRAWING MACHINES
12 Block Scudder, Blocks 8" Dia.
Type B Morgan 4-Block, Capy. #5 Rod down
No. 2 Vaughn 12-Die Continuous, Capy. #14 to #27

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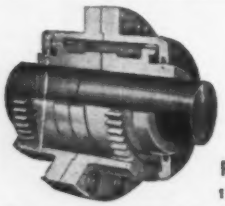

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A
Acco Registered Slings American Chain & Cable Co., Inc. ... 98
*Acme Chain Corporation ... 11
Ajax Electric Co. ... 101
*Ajax Electrothermic Corp. ... 101
Ajax Engineering Corp. ... 101
Alco Products, Inc. ... 109
Allied Research Products, Inc. ... 13
*Allis-Chalmers Mfg. Co. ... 76
American Chain & Cable Co., Inc Acco Registered Slings ... 98
American Optical Co. ... 18
Armel, James P. ... 136
*Armstrong-Blum Manufacturing Co. ... 62
Armstrong Bros. Tool Co. ... 113

B
Baker, J. E., Co., The ... 19
Baldt Anchor, Chain & Forge Div. 138
Baldwin-Lima-Hamilton Corp. Standard Steel Works Division 25
Bay City Forge Co. ... 139
Belyea Co., Inc. ... 134
*Bethlehem Steel Co. ... 1
Boston Metals Company ... 137
Bound Brook Oil-Less Bearing Co. 45
Bullard Co., The ... 24

C
*Cambridge Wire Cloth Co., The 96
Carco Industries, Inc. ... 138
Carpenter Steel Co., The ... 69
*Carpenter Steel Co., The, Alloy Tube Division ... 29
Cattie, Joseph P., & Bros. ... 140
Cities Service Oil Co. ... 97
*Cleveland Worm & Gear Co. ... 36
Colorado Fuel & Iron Corp., The Wickwire Spencer Steel Div. ... 17
Commercial Die Co. ... 139
Consumers Steel & Supply Co. ... 138
Cook County Machinery Co. ... 137
*Cowles Tool Co. ... 105
Cox & Sons Co., The ... 137
*Cromwell Paper Co. ... 48
Crucible Steel Casting Co. ... 132

D
Davidson Pipe Co., Inc. ... 136
Davis Keyseater Co. ... 140
*Dempster Brothers, Inc. ... 95
*DeVilbiss Machine Co. ... 26 & 27
*Duraloy Co., The ... 104

E
Eastern Machinery Co., The ... 136
*Eastman Kodak Co. ... 111
Electric Steel Foundry Company 60
*Elwell-Parker Electric Co. ... 56
Erie Foundry Co. ... 4

F
Fairfield Manufacturing Co. ... 16
Falk Machinery Co. ... 136
Foster, Frank B., Inc. ... 136
Foster, L. B., Company ... 18
Frank, M. K. ... 136

G
Goss & DeLeeuw Machine Co. ... 140
Greenpoint Pipe Supply Co. ... 137
Greist Manufacturing Co., The ... 139

H
Hardinge Mfg. Co. ... 138
Harris Foundry & Machine Company ... 50
Heller, Albert ... 136
Hendrick Manufacturing Co. ... 105
Henry, A. T. & Company, Inc. ... 135
*Hobart Brothers Company ... 8
Huebel Mfg. Co., Inc. ... 138
Hughes, Arnold Co. ... 137-138
Hyde Park Foundry & Machine Co. ... 94
Hyman, Joseph, & Sons ... 134

I
Inductotherm Corporation ... 12
Iron & Steel Products, Inc. ... 135

J
*James D O Gear Manufacturing Co. ... 68

K
*Kenco Manufacturing Co. ... 106
Keystone Forging Co. ... 139
King Foundries, Inc. ... 138
Kramer, P. S. ... 138
*Kutztown Foundry & Machine Corp. ... 117

L
Lamson & Sessions Co., The ... 58
Lang Machinery Co. ... 136
*Lawrence Warehouse Company ... 103
*Lincoln Electric Co. ... 31
Luria Bros. & Co., Inc. ... 123

M
M. E. T. Equipment & Construction Co. ... 136
MacCabe, T. B., Co. ... 134-137
*MacLeod Company, The ... 132
Magnaflux Corporation ... 55
Magnethermic Corp. ... 73
Mahon, R. C., Co., The ... 139
Mesta Machine Co. Inside Front Cover
Miles Machinery Co. ... 135
Morrison Railway Supply Corp. ... 137

N
National Acme Co., The ... 71
National Business Bourse, Inc. ... 138
National Machinery Exchange ... 136
National Steel Corp. ... 93
*New Departure Div. General Motors Corp. ... 34
New England Pressed Steel Co. ... 138
*Niagara Blower Co. ... 119
*Niagara Machine & Tool Works ... 14 & 15
*Northern Engineering Works ... 102

O
Ohio Ferro-Alloys Corp. ... 5
Olson Manufacturing Co. ... 139
Ornitz Equipment Corp. ... 136
Orton Crane & Shovel Co. ... 121

P
Pacific American Comm. Co. ... 137
*Pangborn Corp. ... 65 & 67
Peninsular Steel Company ... 46
Peterson Steels, Inc. ... 72
Pickands Mather & Co. ... 30
Pittsburgh Steel Co. ... 32 & 33
Platt Bros. & Co., The ... 140
*Poole Foundry & Machine Co. ... 140
Power Press Specialists ... 135
Purdy Company, The ... 137

R
*Republic Steel Corp. ... 22 & 23
Rosedale Foundry & Machine Co. 139

S
Saling Manufacturing Company ... 139
Sharon Steel Corp. ... 6
*Shepard Niles Crane & Hoist Corp. ... 112
Smith, Thomas Co. ... 138
Southern Screw Co. ... 9
Standard Steel Works Div., The Baldwin-Lima-Hamilton Corp. ... 25
Stanhope, R. C., Inc. ... 135
Sumitomo Metal Industries, Ltd. ... 117
Sun Shipbuilding & Dry Dock Co. ... 117

T
Timken Roller Bearing Co., The ... 28
Tippins Machinery Co. ... 136
*Tomkins-Johnson Co., The ... 107

U
Universal Machinery & Equipment Co. ... 135

V
Valley Steel Products Co. ... 138
Verson Allsteel Press Co. Back Cover

W
Wallack Bros. ... 138
Weatherly Foundry & Mfg. Co. ... 139
*Weirton Steel Co. ... 93
Weiss, B. M., Co. ... 136
Weiss Steel Co., Inc. ... 138
Weiss, David, Co. ... 137
Welding Fittings Corp. ... 135
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp. ... 17
Wilcox Forging Corp. ... 138
Wilson, Lee, Engineering Co., Inc. Inside Back Cover

Y
Yale & Towne Manufacturing Co., The ... 20 & 21
Youngstown Sheet & Tube Co., The 114

CLASSIFIED SECTION

Clearing House ... 134, 139
Contract Manufacturing ... 139-140
Employment Exchange ... 139
Equipment & Materials Wanted ... 139

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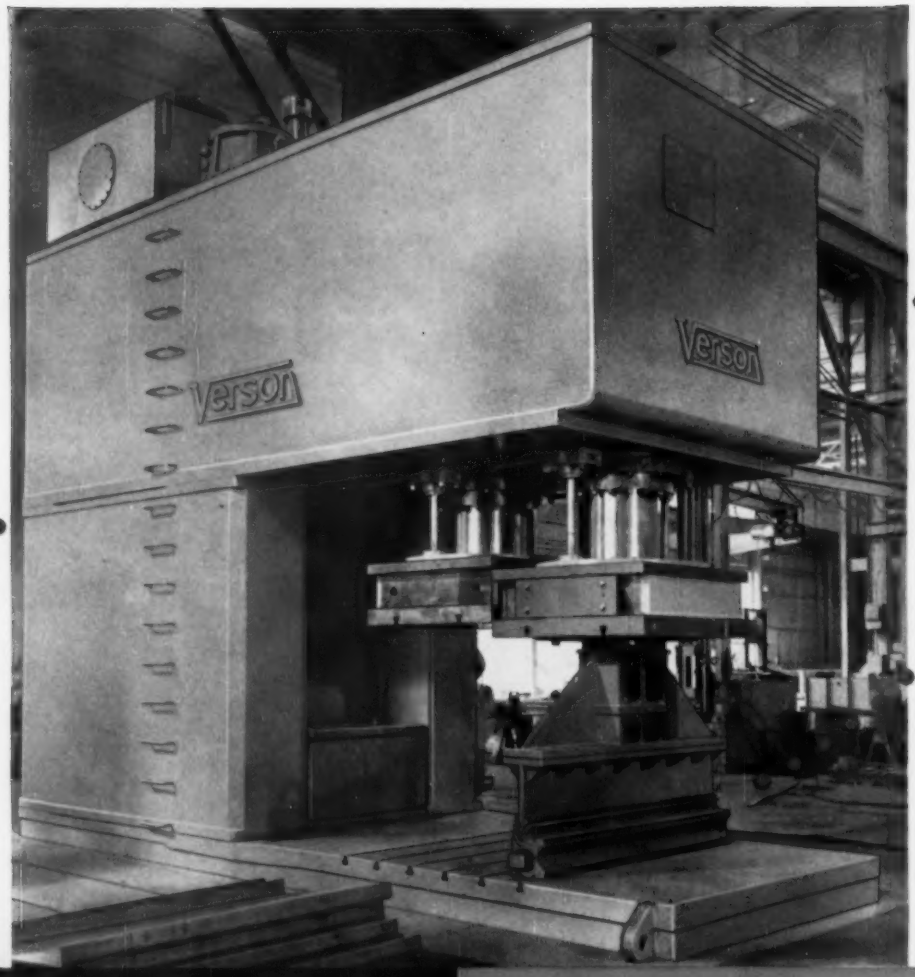

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